Mount Sinai Hospital

Surgical Management of Gastric Cancer

Dr Savtaj Brar | Mount Sinai Hospital

BC Cancer Surgery Network Fall Update

UNIVERSITY OF TORONTO

Disclosure

I have no financial disclosures

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Outline

- Discuss extent of resection and lymphadenectomy in gastric cancer
- Review the role of minimally invasive approaches in the treatment of gastric cancer
- Update current strategies for reconstruction following gastrectomy

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Background

- 2017 estimates in Canada
  - 3,500 diagnosed with stomach cancer
  - 2,100 died from stomach cancer
  - 14th most common cancer

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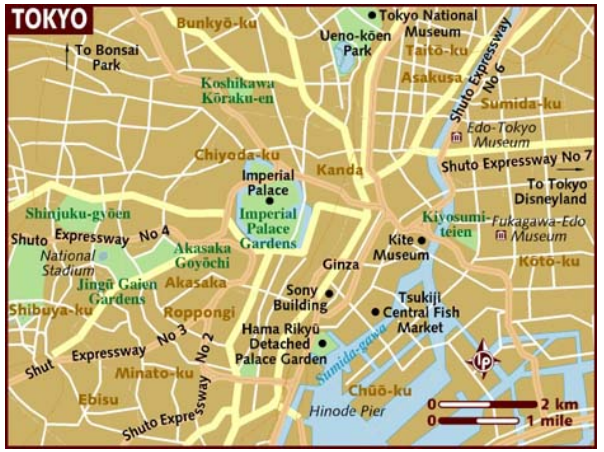
Background

CANCER INSTITUTE HOSPITAL OF JFCR



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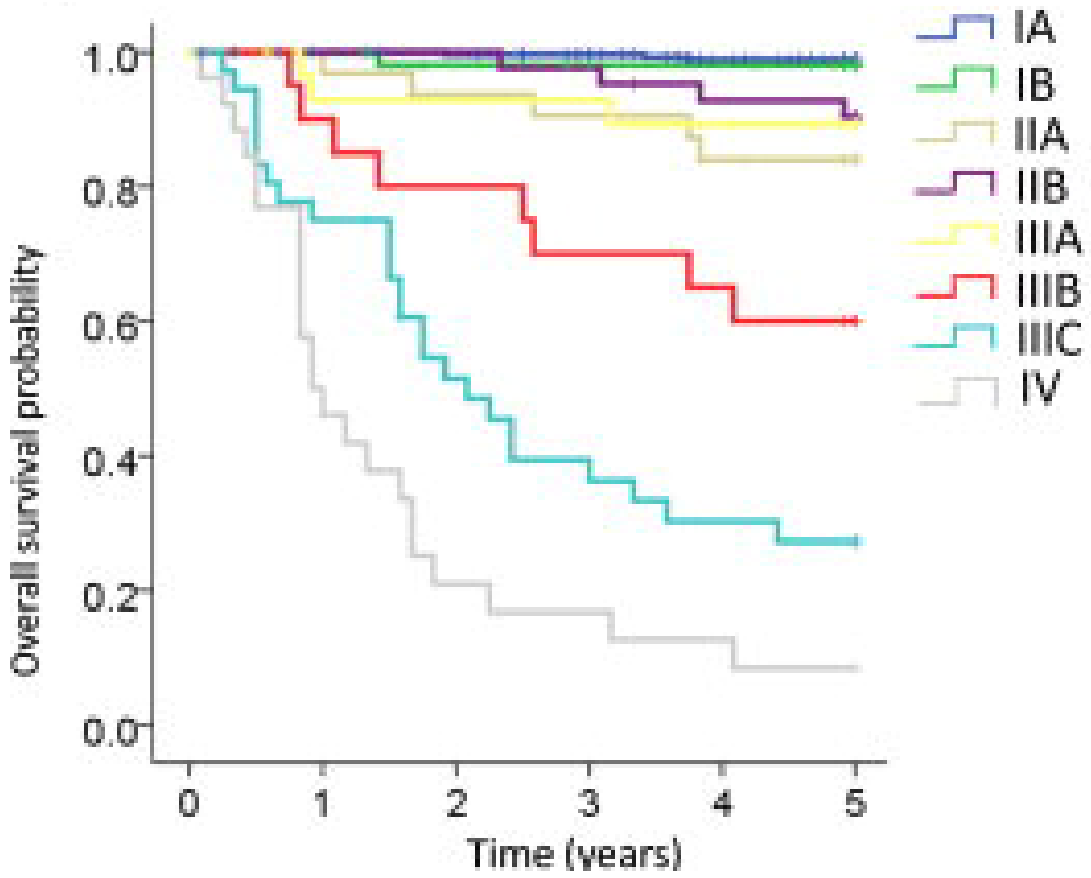
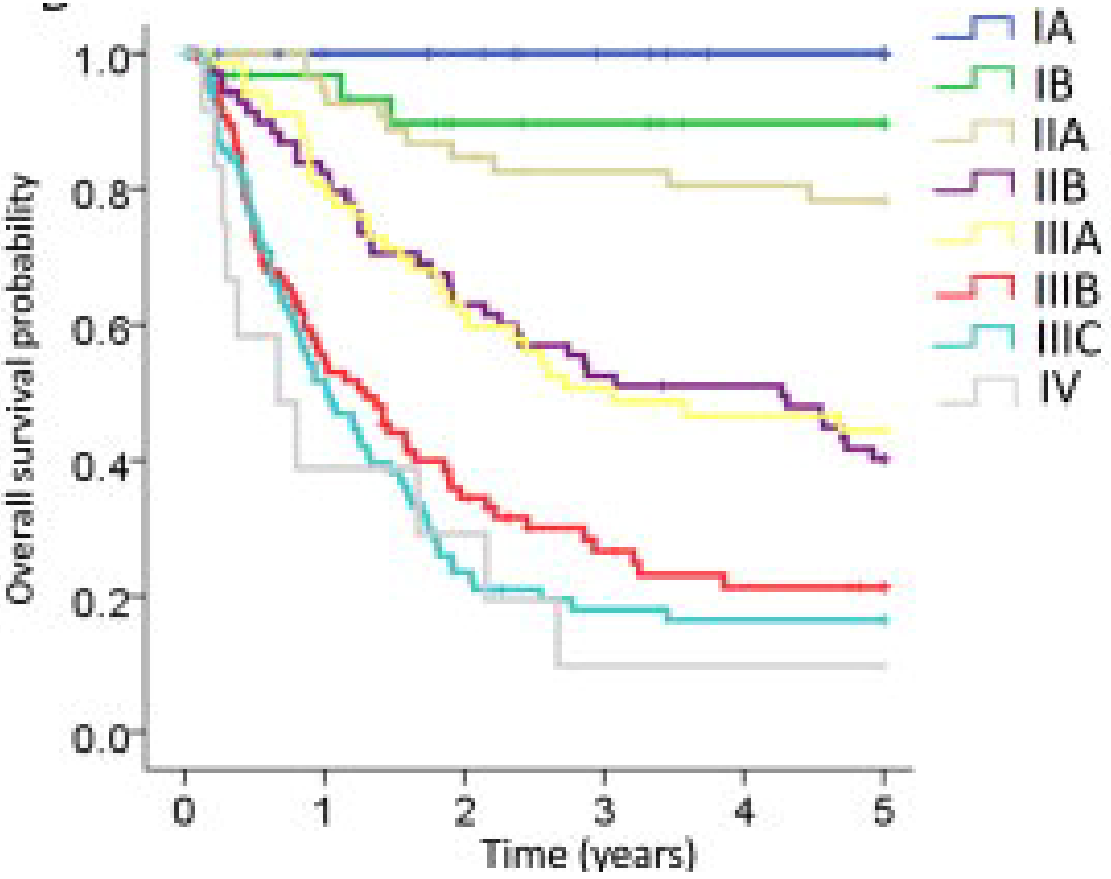
East vs West





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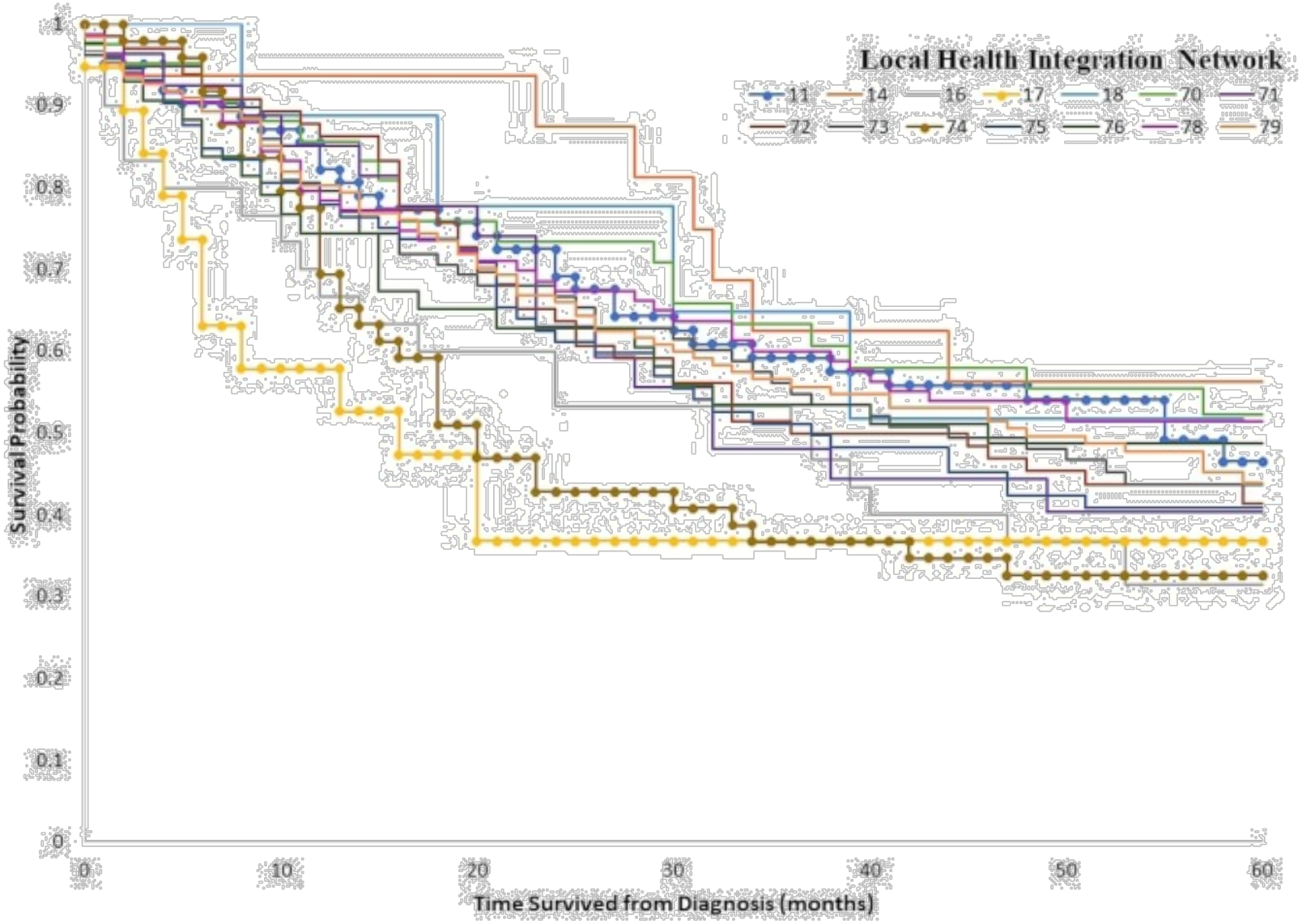
Outcomes

Overall 5-year survival was 44% and ranged from 31% - 55% across Ontario

Variations in

- operative mortality
- positive margin rate
- lymph nodes



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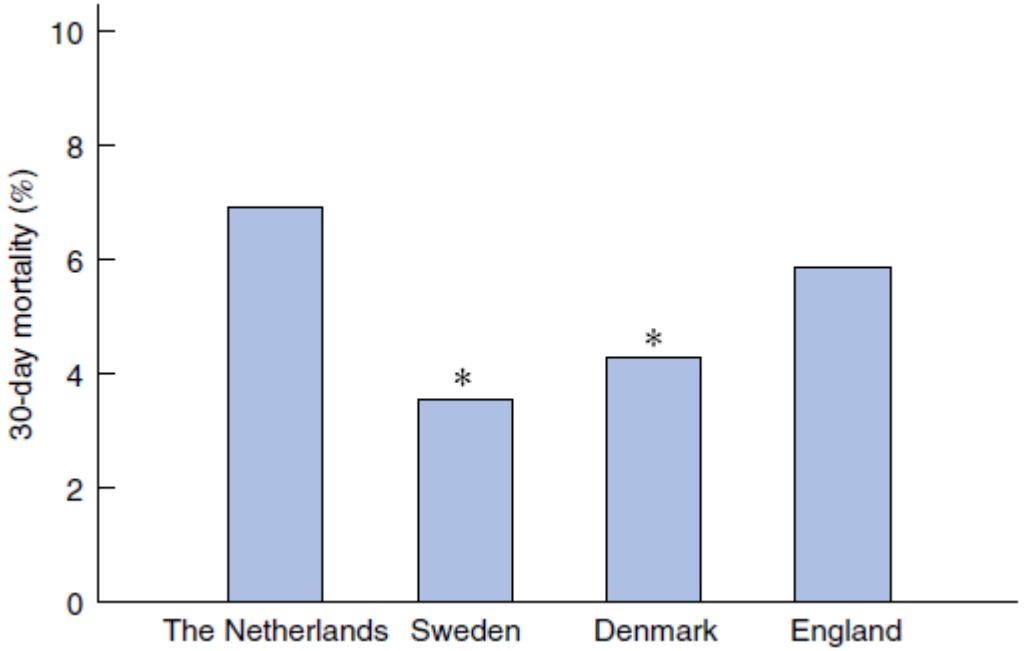
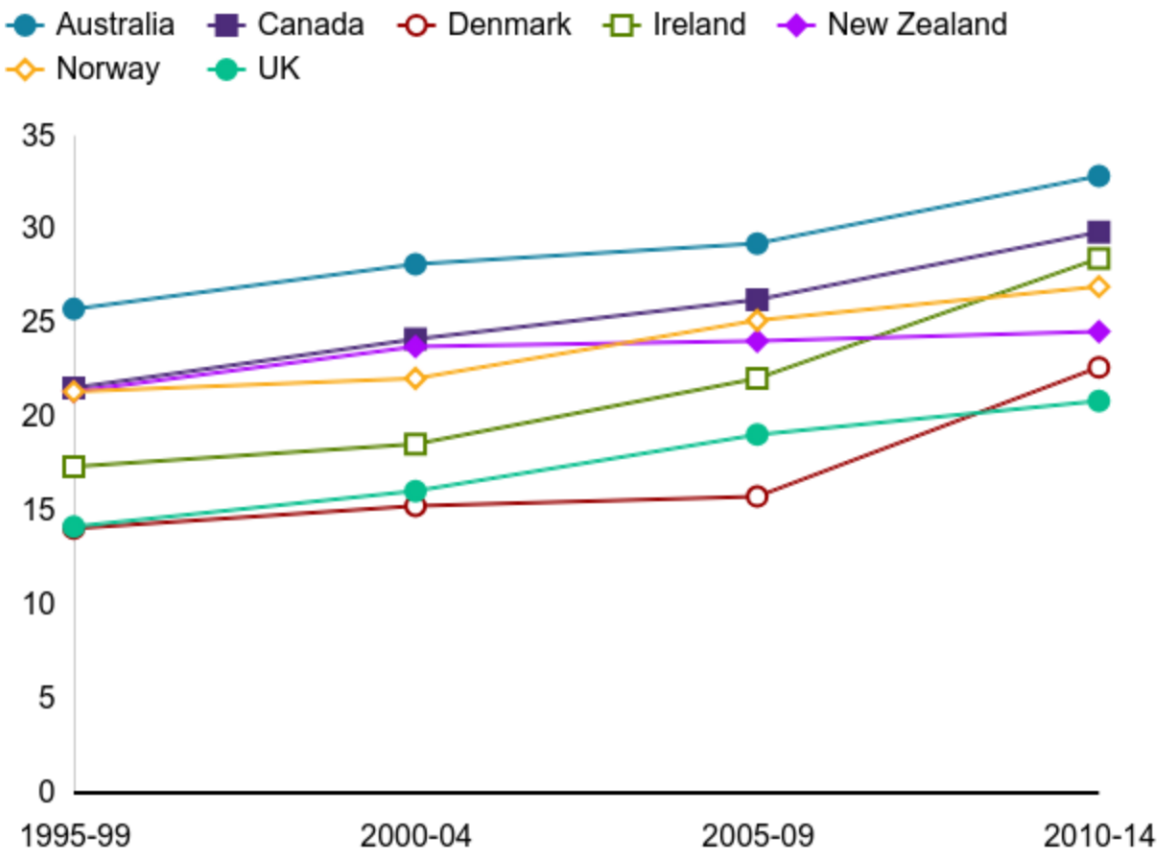
Outcomes



Stomach cancer survival rates are improving

Patients surviving five years (%)



Source: ICBP/Lancet

BBC

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Background

How can surgeons influence the outcome of patients with gastric cancer?

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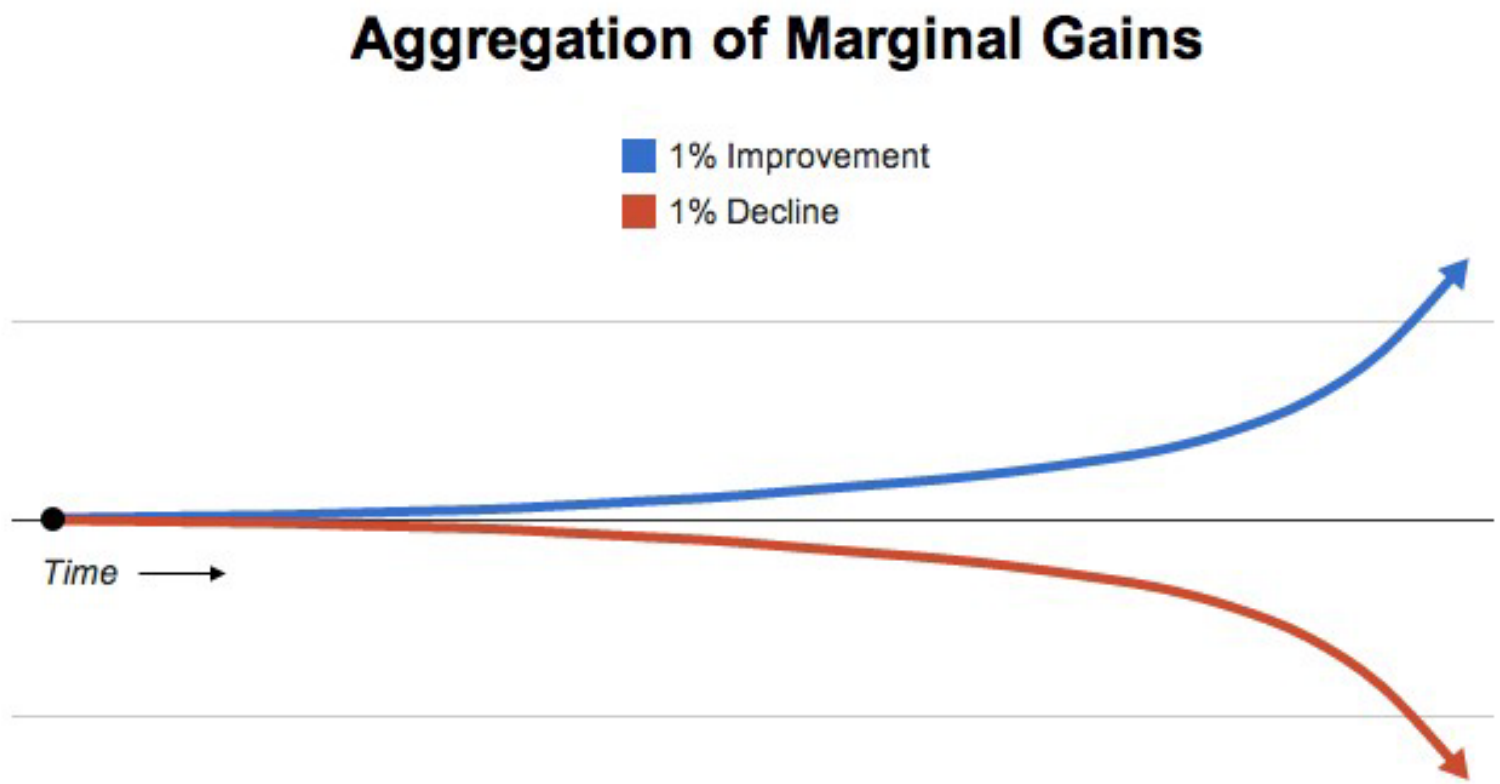
Background



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Workup

- Endoscopy with multiple biopsies (6-8)
- Assess for iron deficiency anemia
- CT scan CHEST ABDO PELVIS
- +/- Endoscopic ultrasound
- +/- Diagnostic Laparoscopy + cytology
- Discussion at MCC

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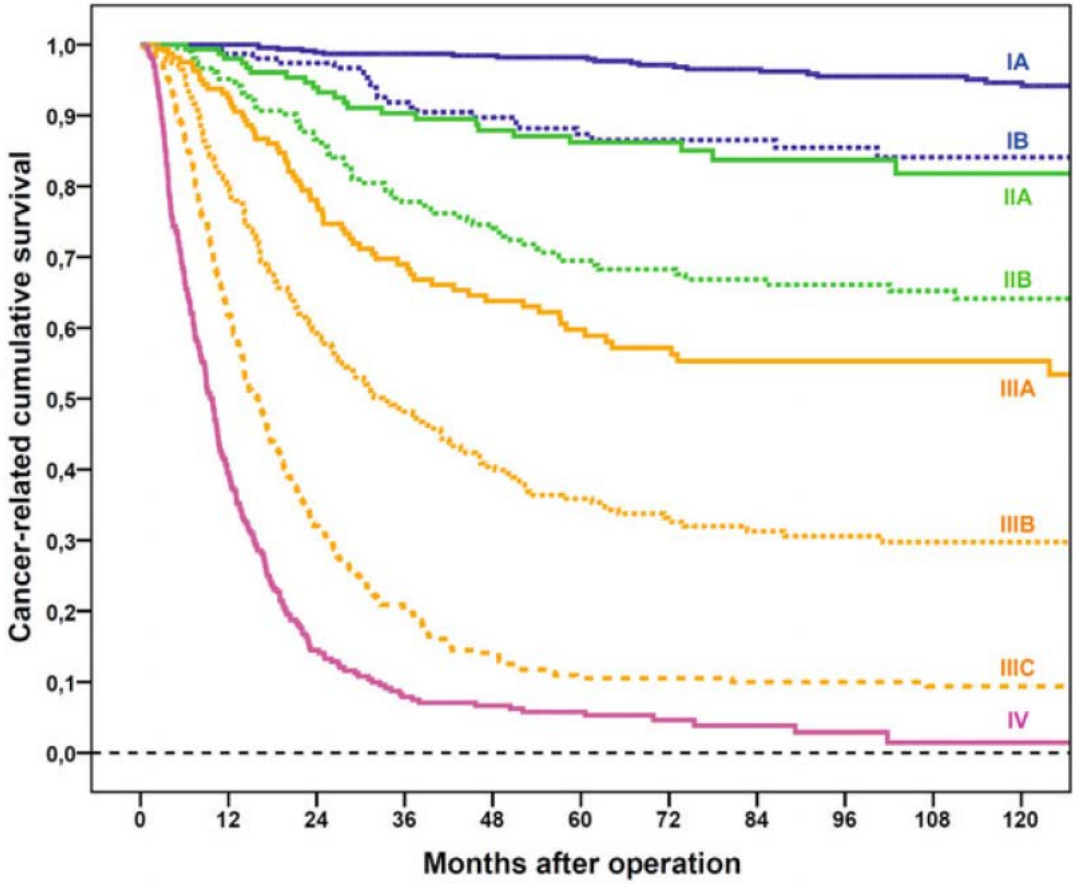
Workup



EARLY

ADVANCED

METASTATIC

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Management

T1 N0 M0

- EUS
- Gastrectomy with limited lymphadenectomy (D1/D1+) or endoscopic resection
- No chemotherapy or radiotherapy

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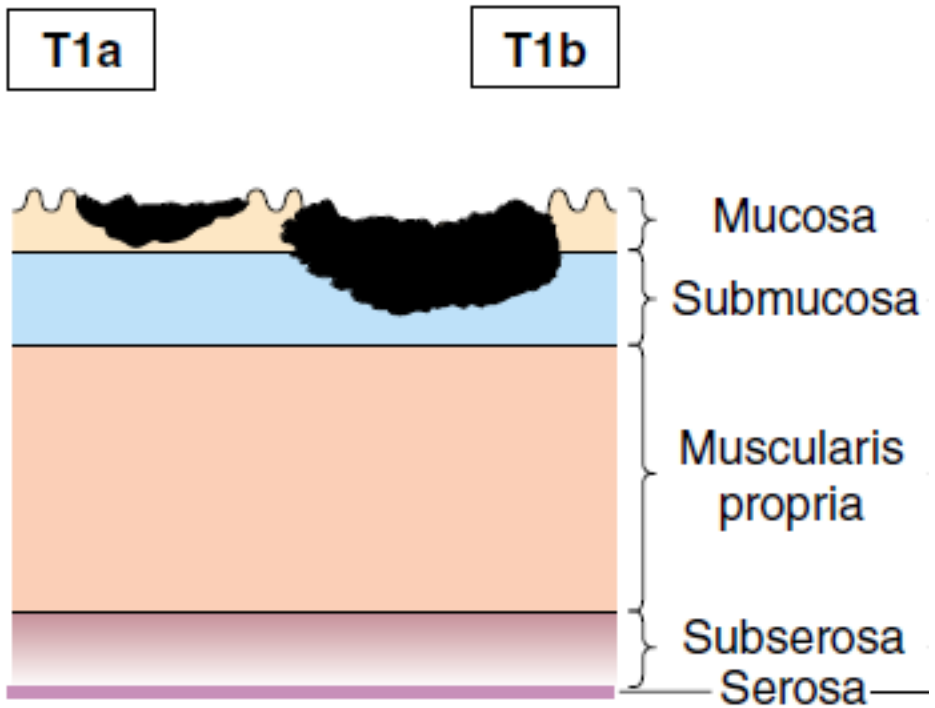
Early gastric cancer



T1a (mucosa)
3% LN+
99% 5 year survival

T1b (submucosa)
up to 20% LN+
96% 5 year survival

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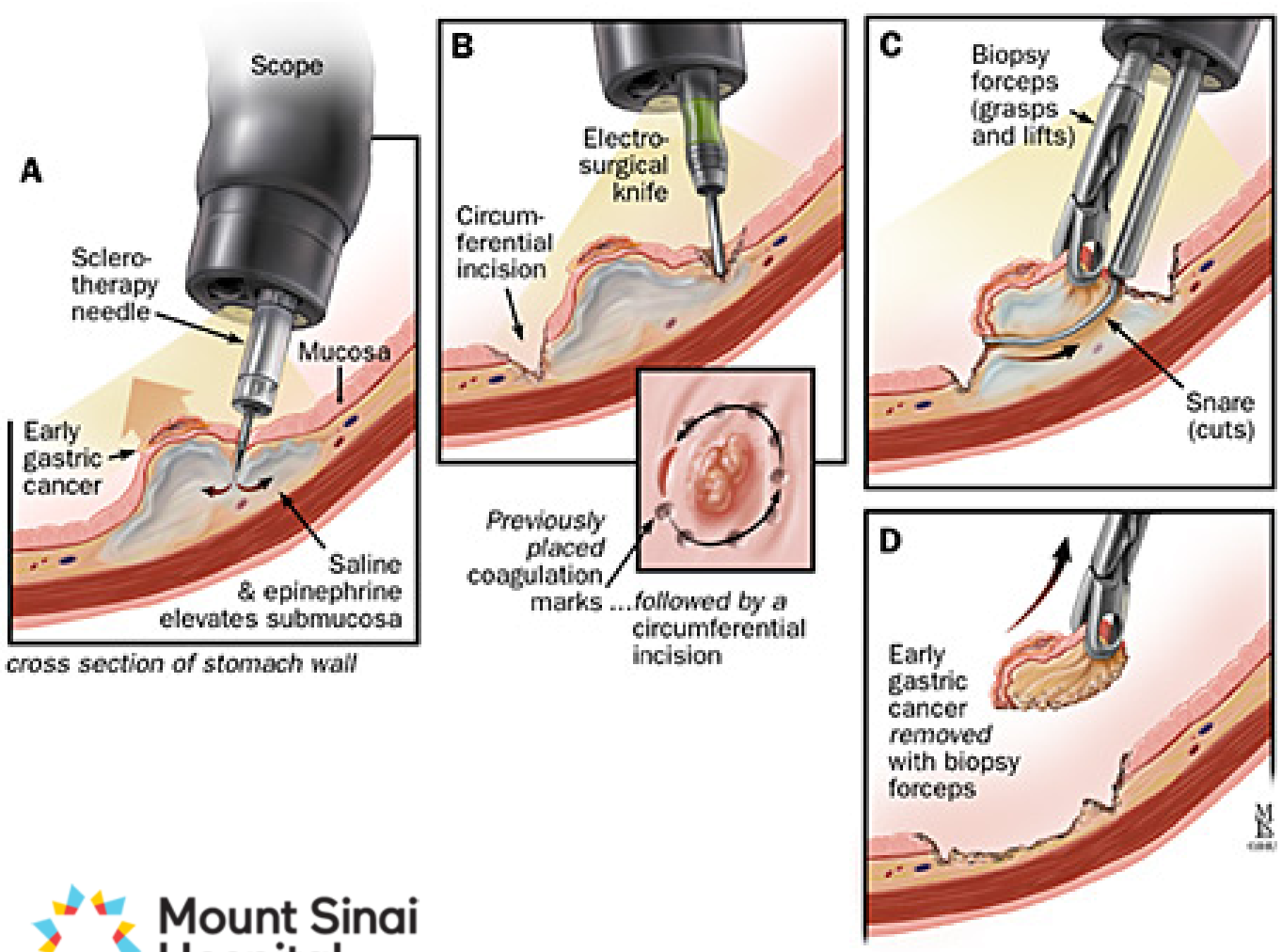
Endoscopic resection



Indications:

- Tis, T1a
- well-differentiated
- < 2cm diameter
- no ulceration

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Management

T2-4 or N+ MO

- Diagnostic laparoscopy+washings
- Gastrectomy with D2 lymphadenectomy
- Perioperative chemotherapy

OR

- Postoperative chemoradiotherapy

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Margins

- Extent of resection depends on location with goal of R0 resection → T1: 3cm and T2-4: 4-6 cm
- Higher risk of positive margins in T4, node positive, diffuse type including signet ring cell
- Preoperative chemotherapy decreases chance of positive margin
- CCO target: Positive margin rate <5%

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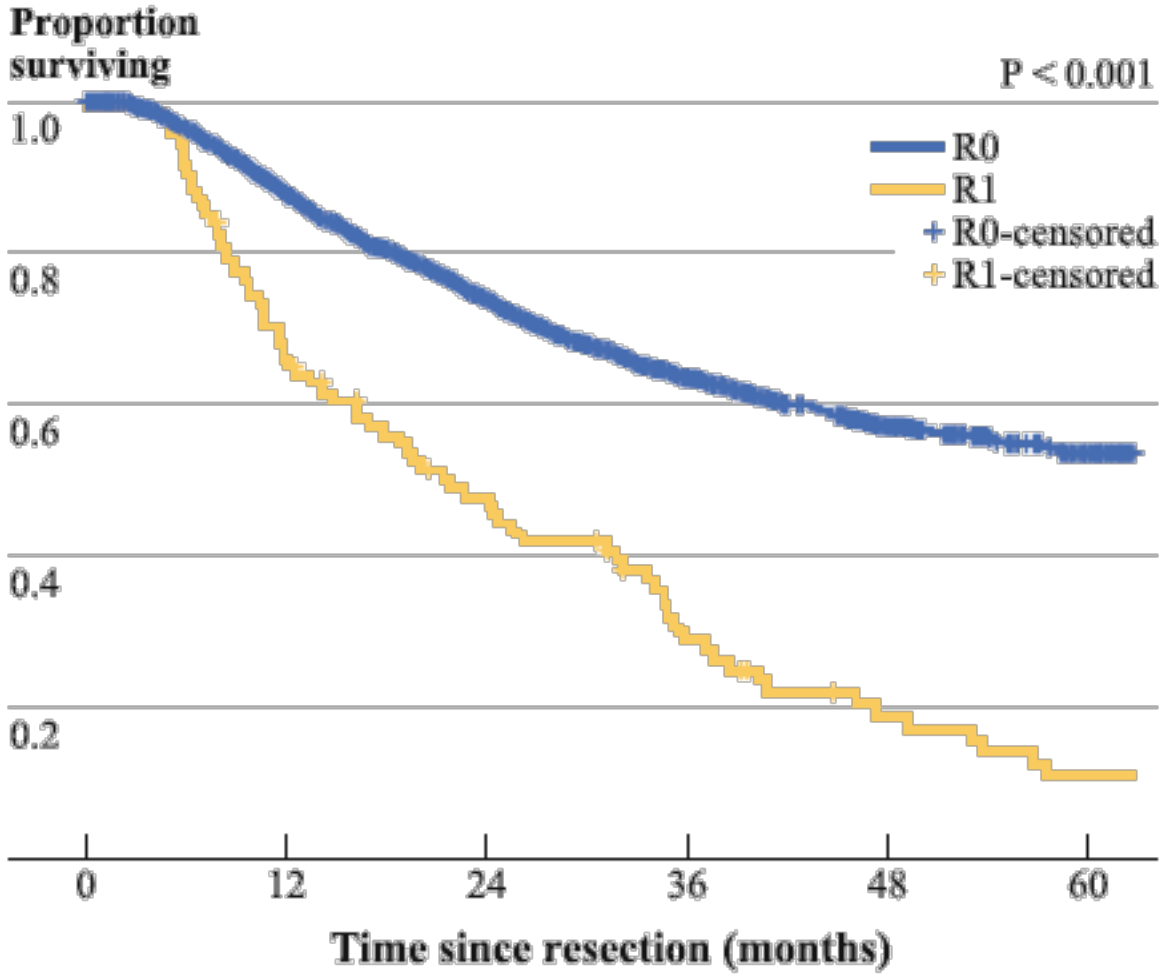
Margins



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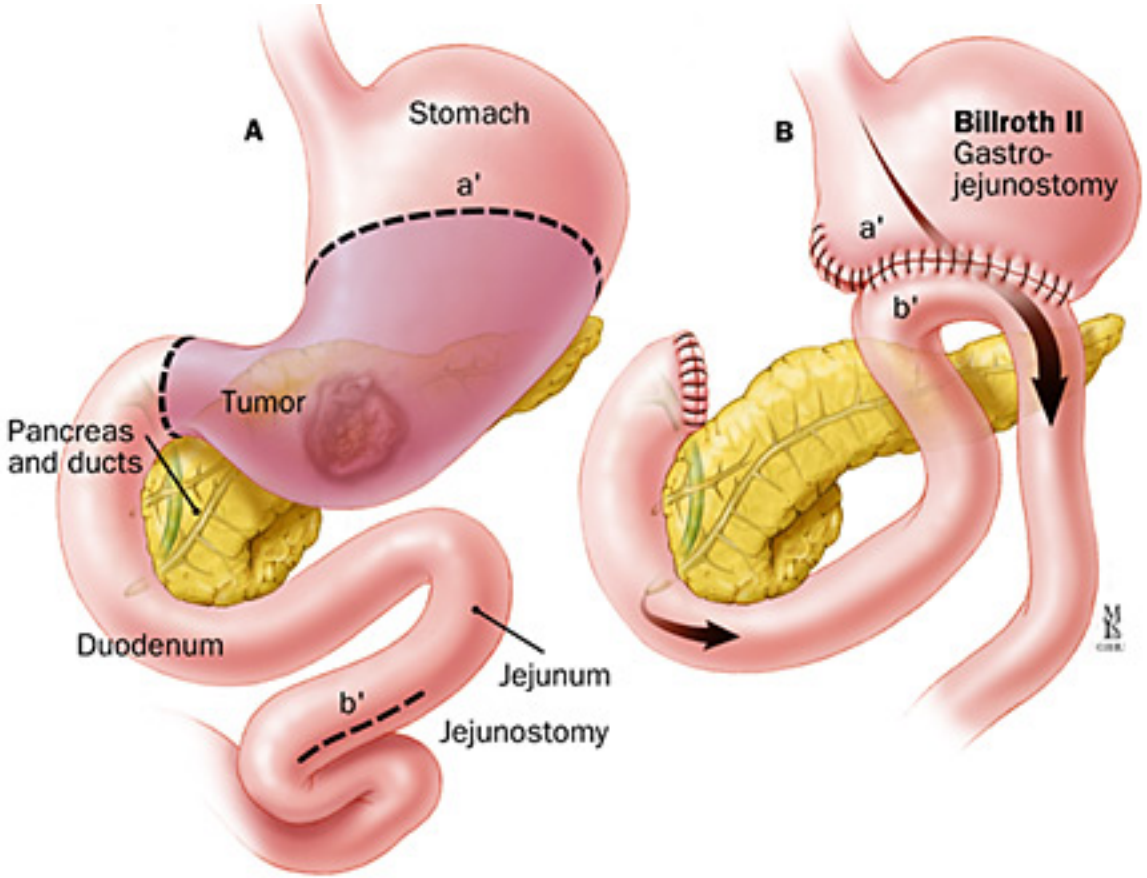
Subtotal gastrectomy



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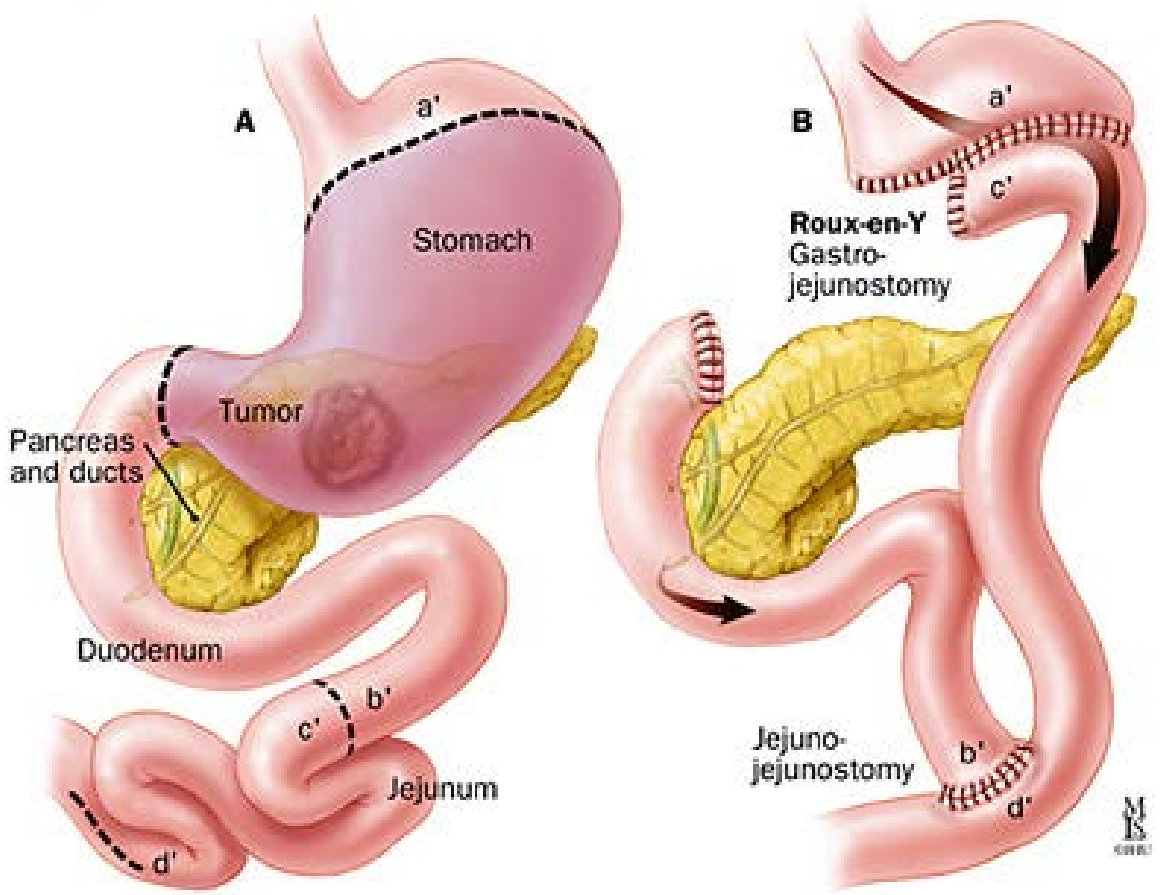
Near-total gastrectomy



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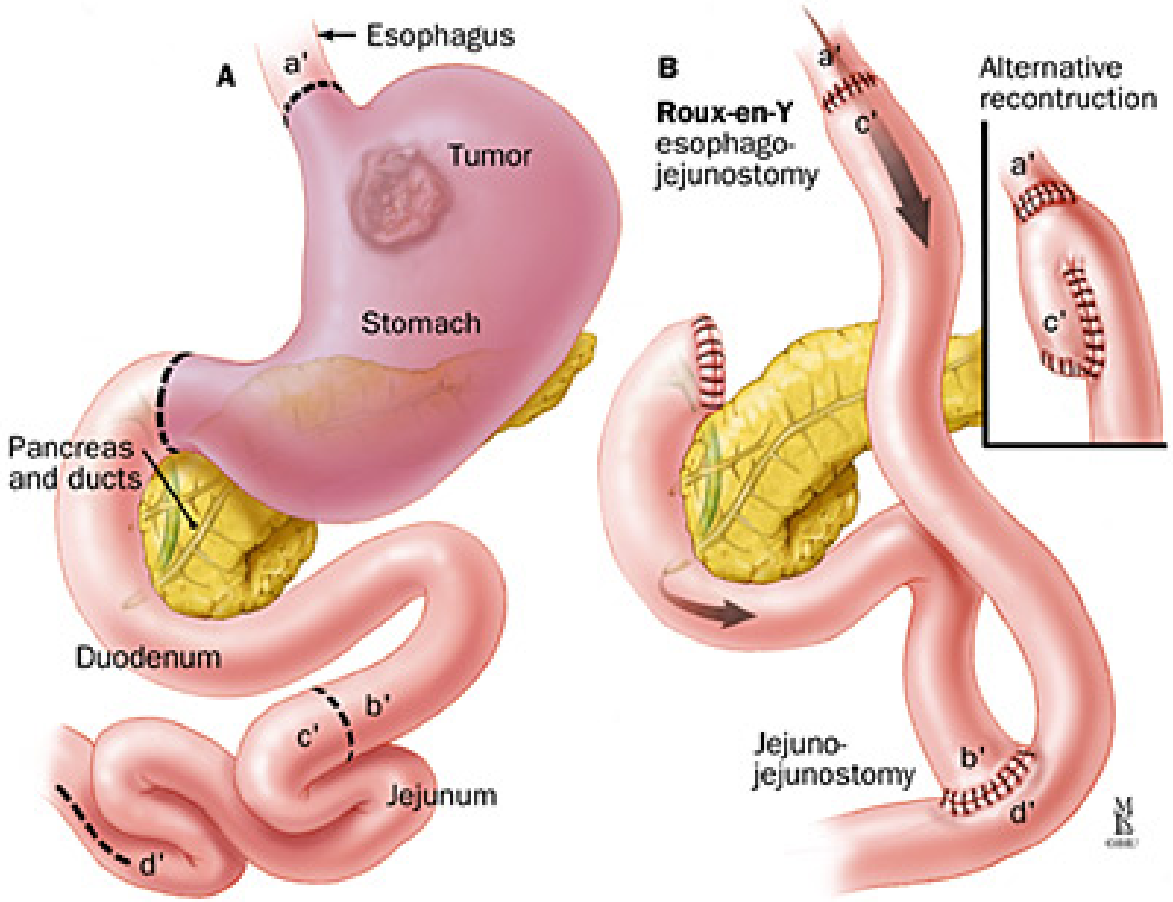
Total gastrectomy



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Margins

- Intraoperative pathology consultation including can be useful in improving R0 resection rates
- Beware high rate of false-negative in signet ring cell adenocarcinoma
- Intraoperative endoscopy recommended esp for laparoscopic cases
- Margin status not relevant to survival with node positive patients

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Reconstruction

- Generally, if less than 25% stomach remnant reconstruction with Roux-en-Y
- Division of jejunum ~ 25 cm from Treitz after second jejunal branch usually has mobility to reach hiatus
- Roux limb usually 45-50 cm
  - Use umbilical tape to measure out Roux limb in laparoscopic cases

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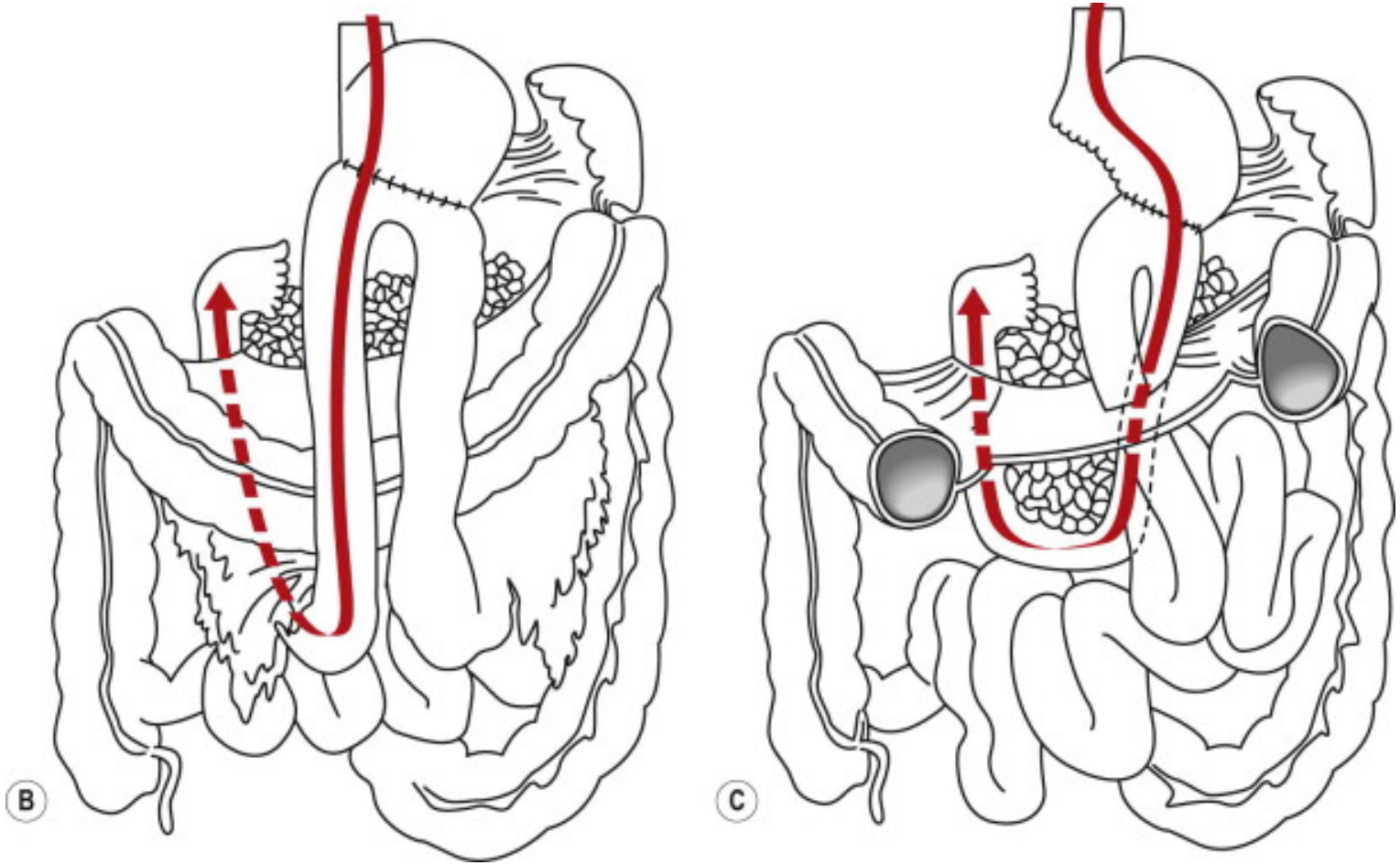
Reconstruction

Traditionally, antecolic reconstruction was performed, but some nonrandomized evidence supports better functional outcomes after retrocolic gastrojejunostomy



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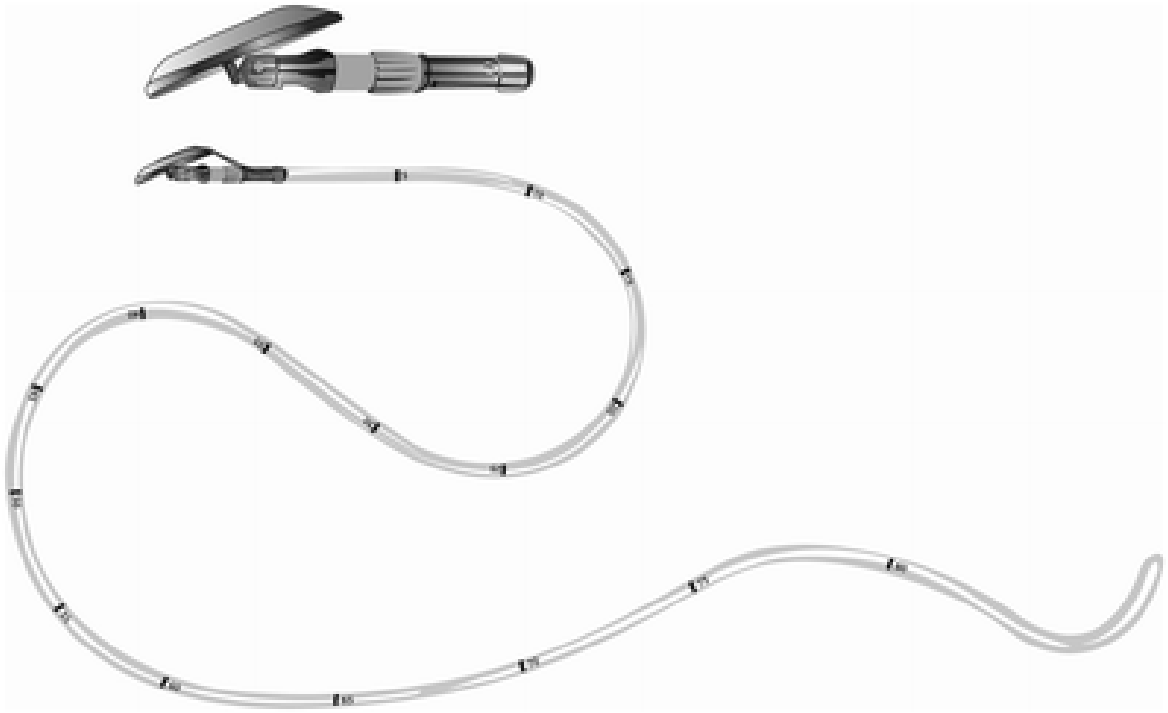
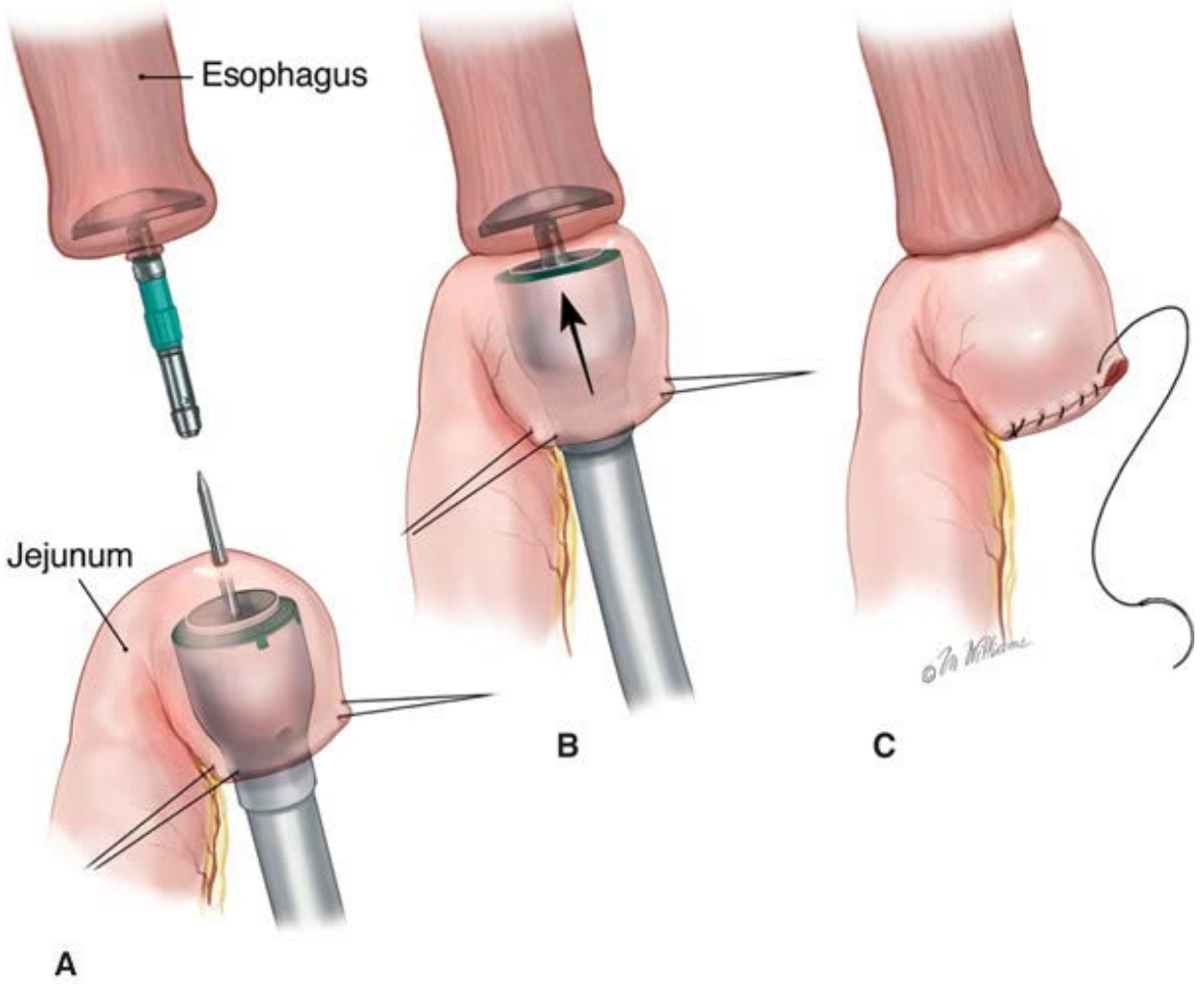
Reconstruction





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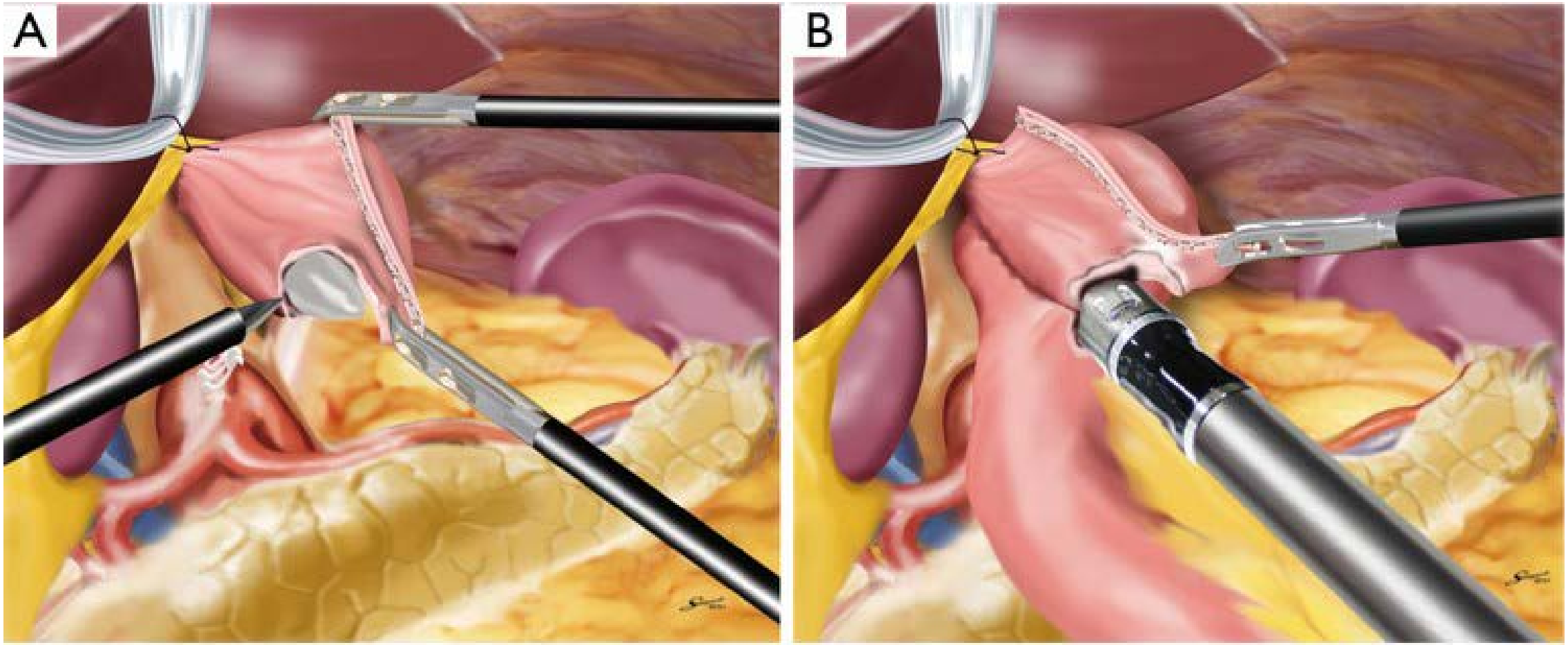
Reconstruction



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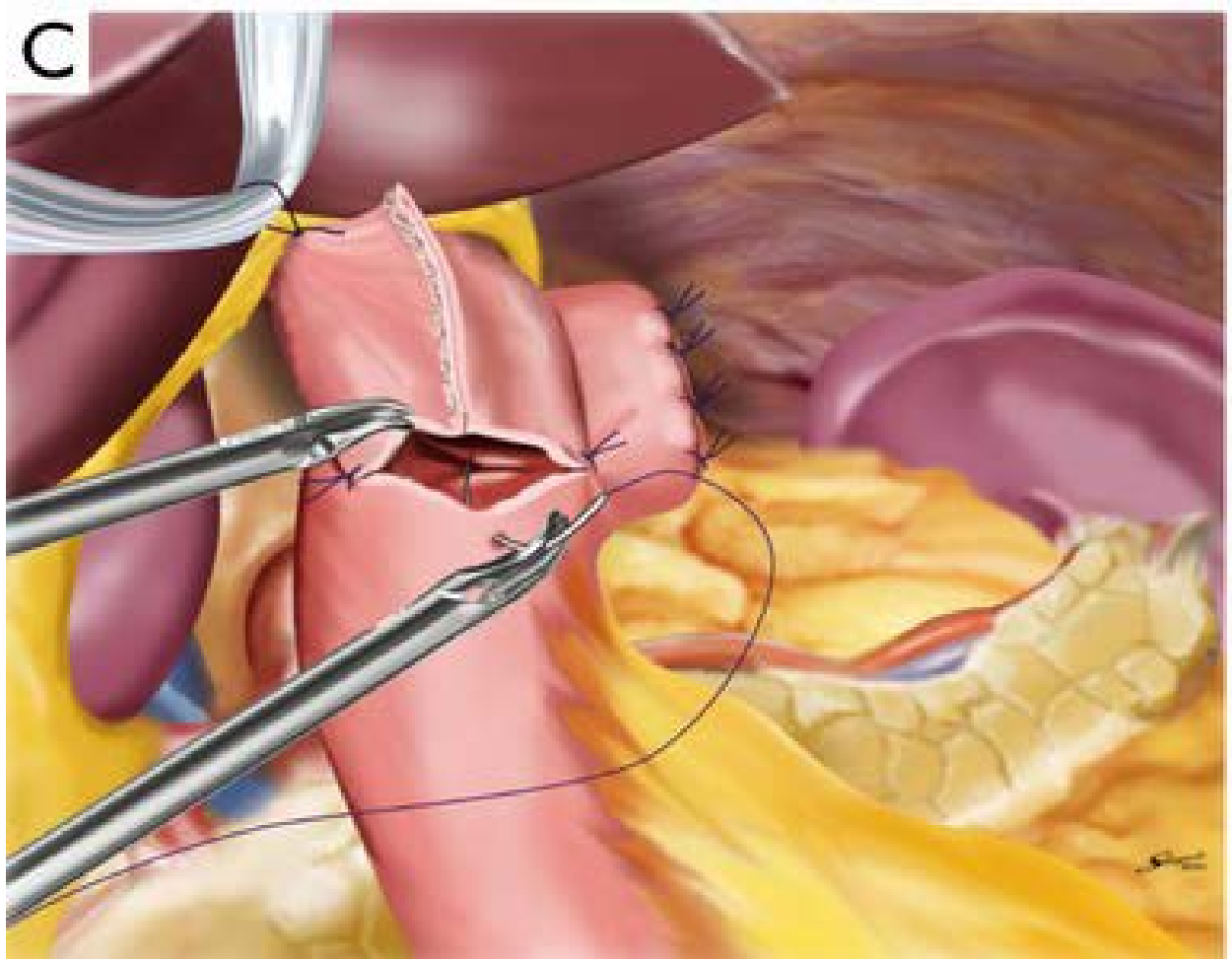
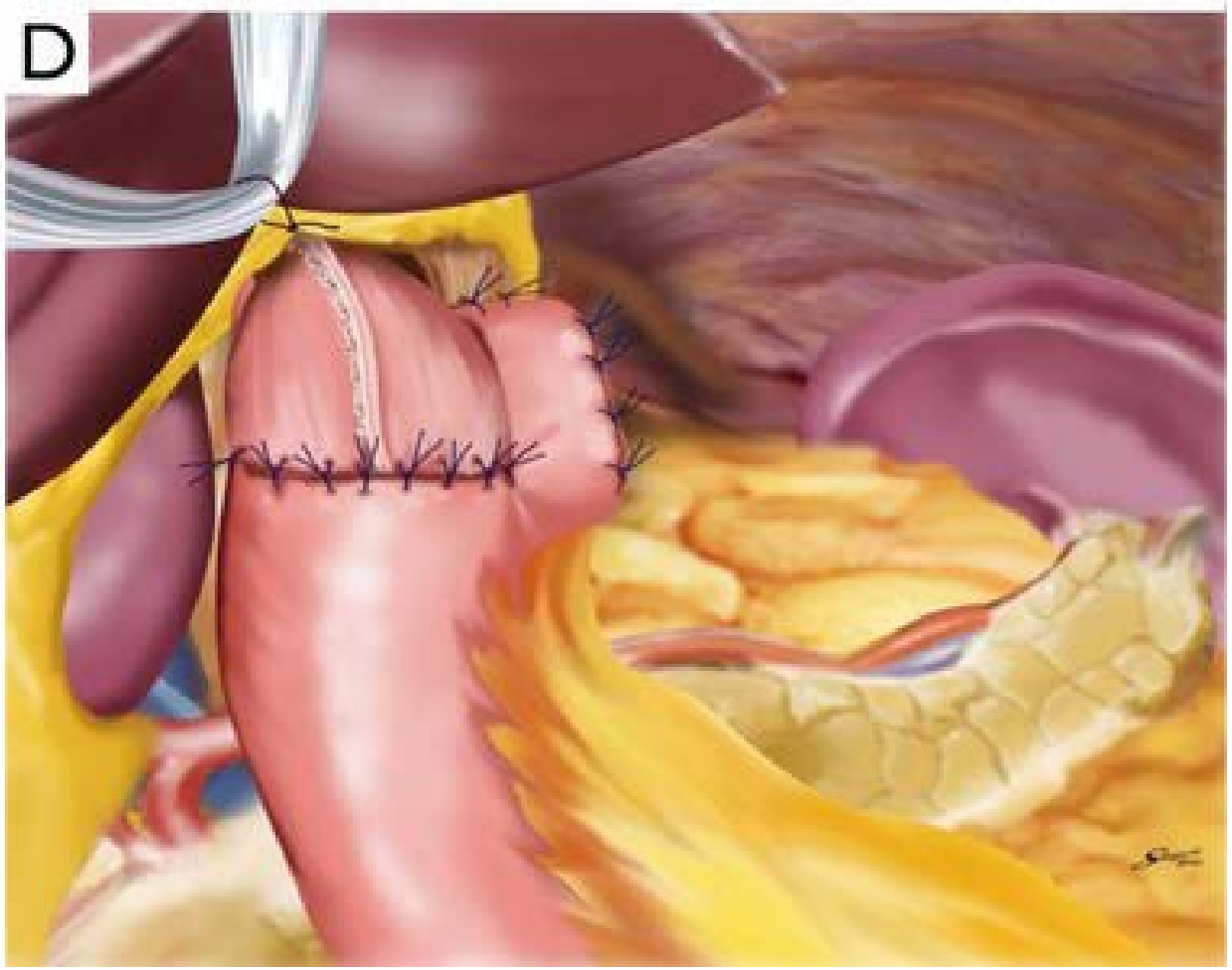
Reconstruction





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Jejunal pouch

- Meta-analysis supports improved outcomes with jejunal pouch reconstruction
  - ↓ dumping syndrome
  - ↓ weight loss
  - ↓ reflux symptoms
  - Improved QOL including > 12 month postoperative

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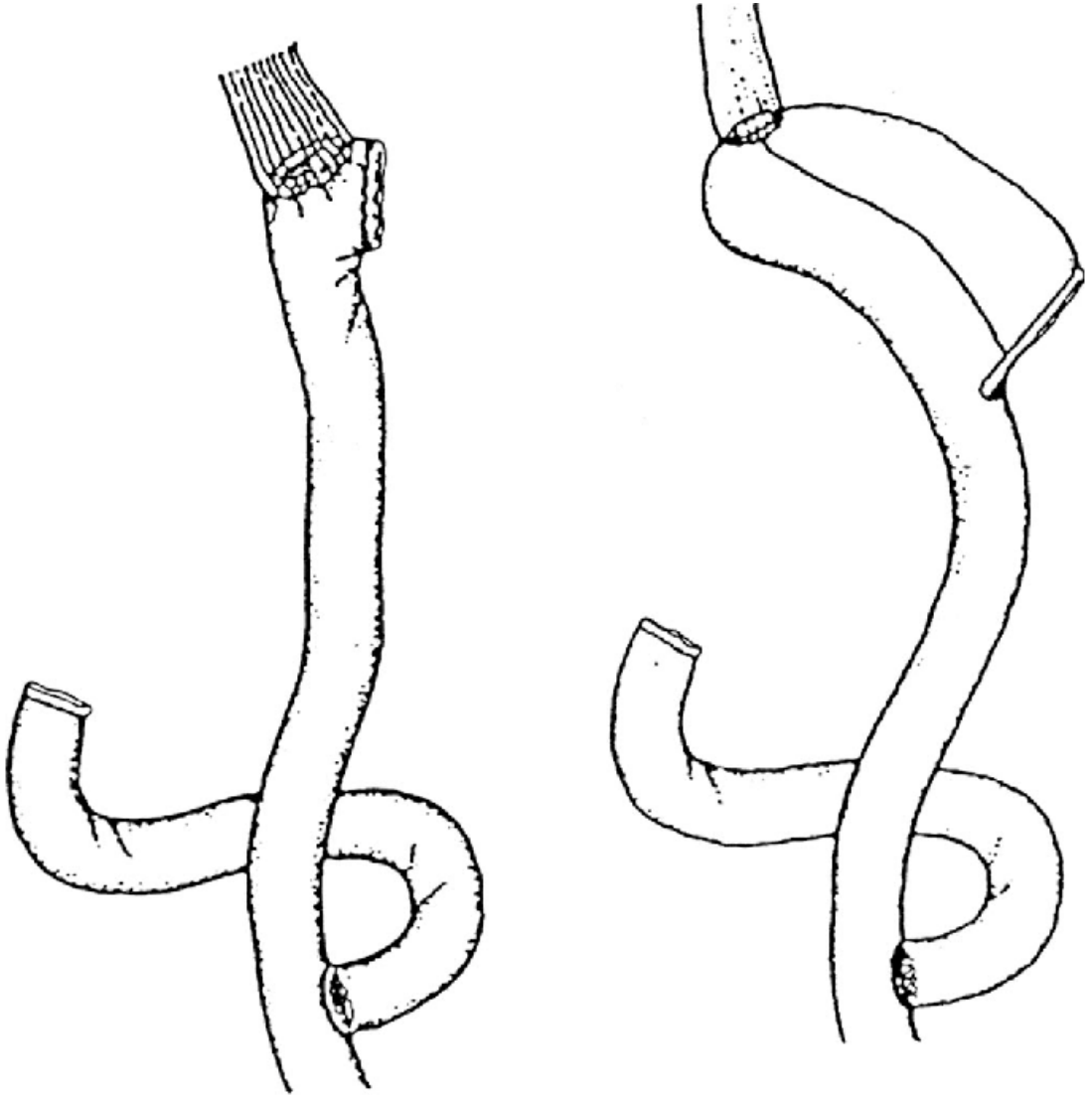
Jejunal pouch

- Pouch length should be around 15 cm
- No increased risk of perioperative complications
- Can be completed open vs laparoscopic



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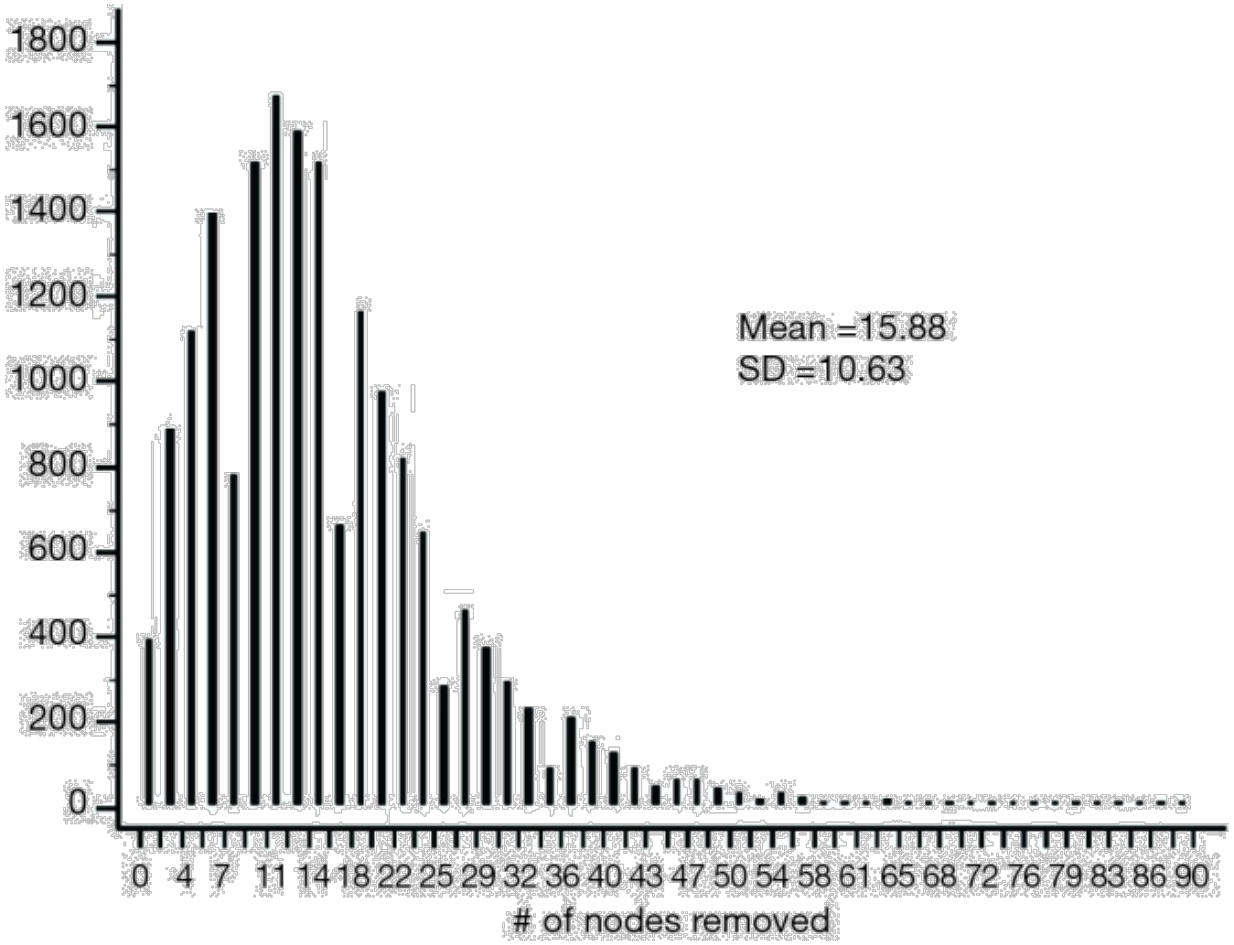
Lymph nodes

- Retrieval of at least 16 lymph nodes is recommended
- In most studies in North America median is ~15



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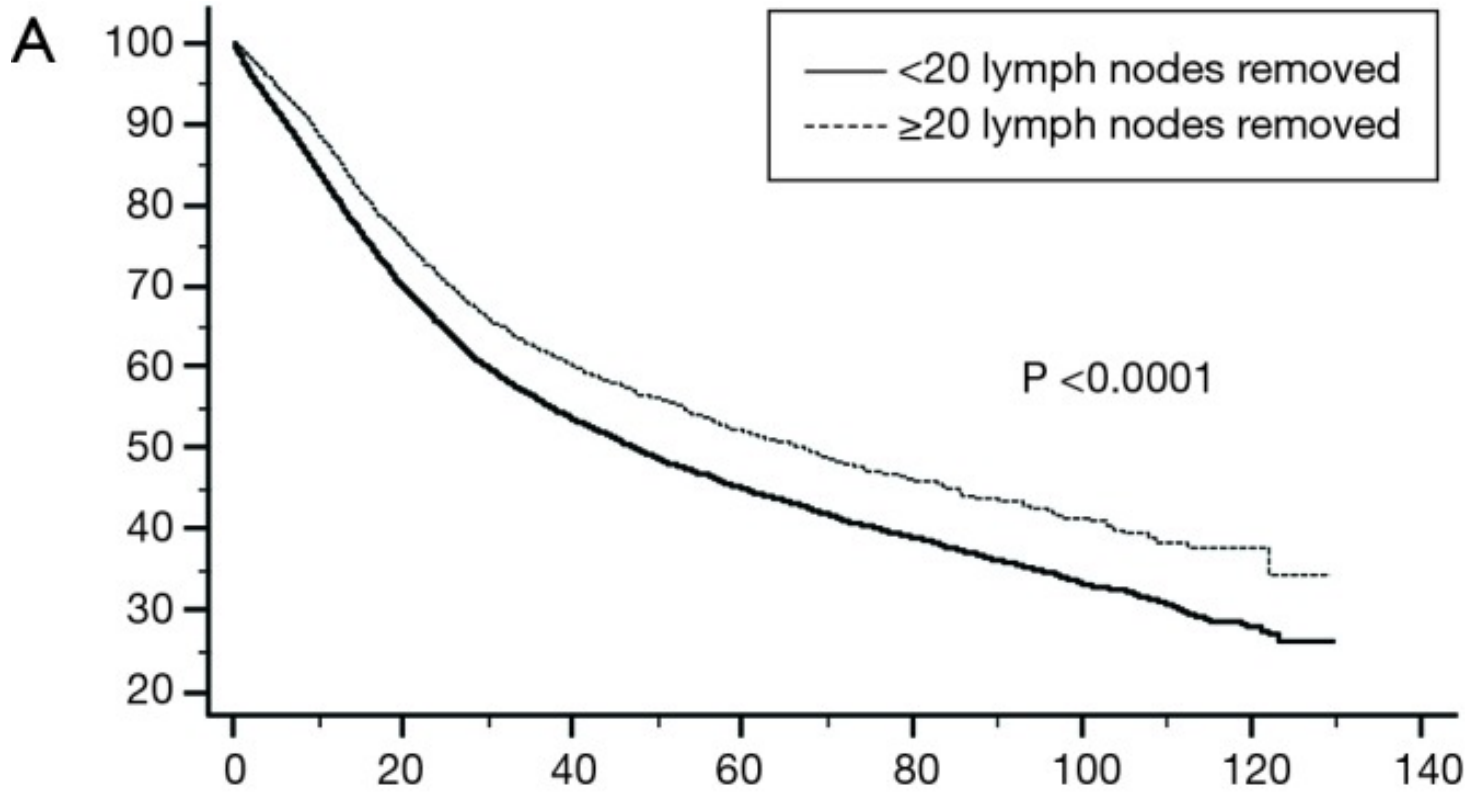
Lymph nodes



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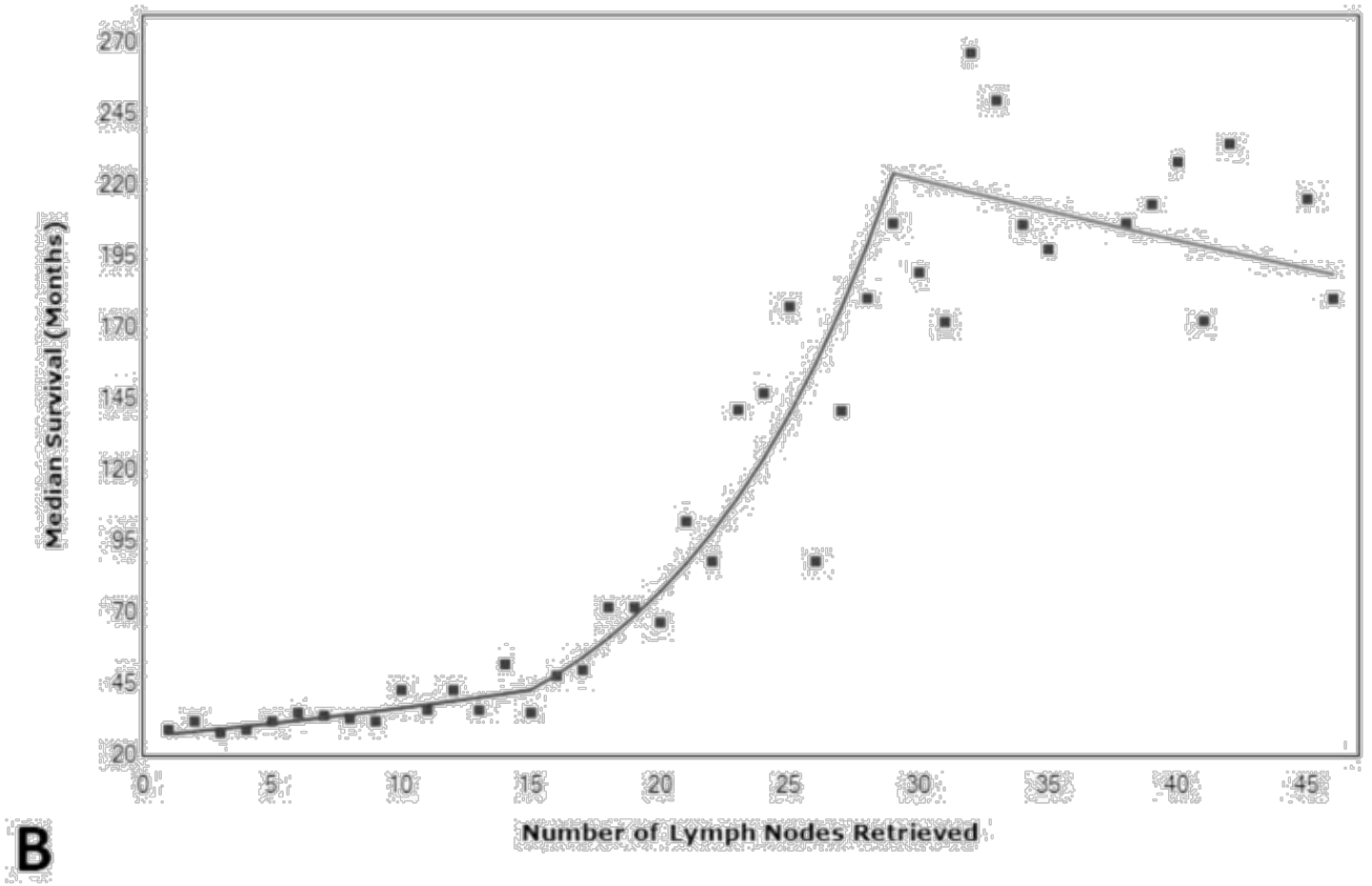
Lymph nodes



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Lymphadenectomy

- Guidelines: D2 lymphadenectomy for patients with >T1 N+ gastric cancer

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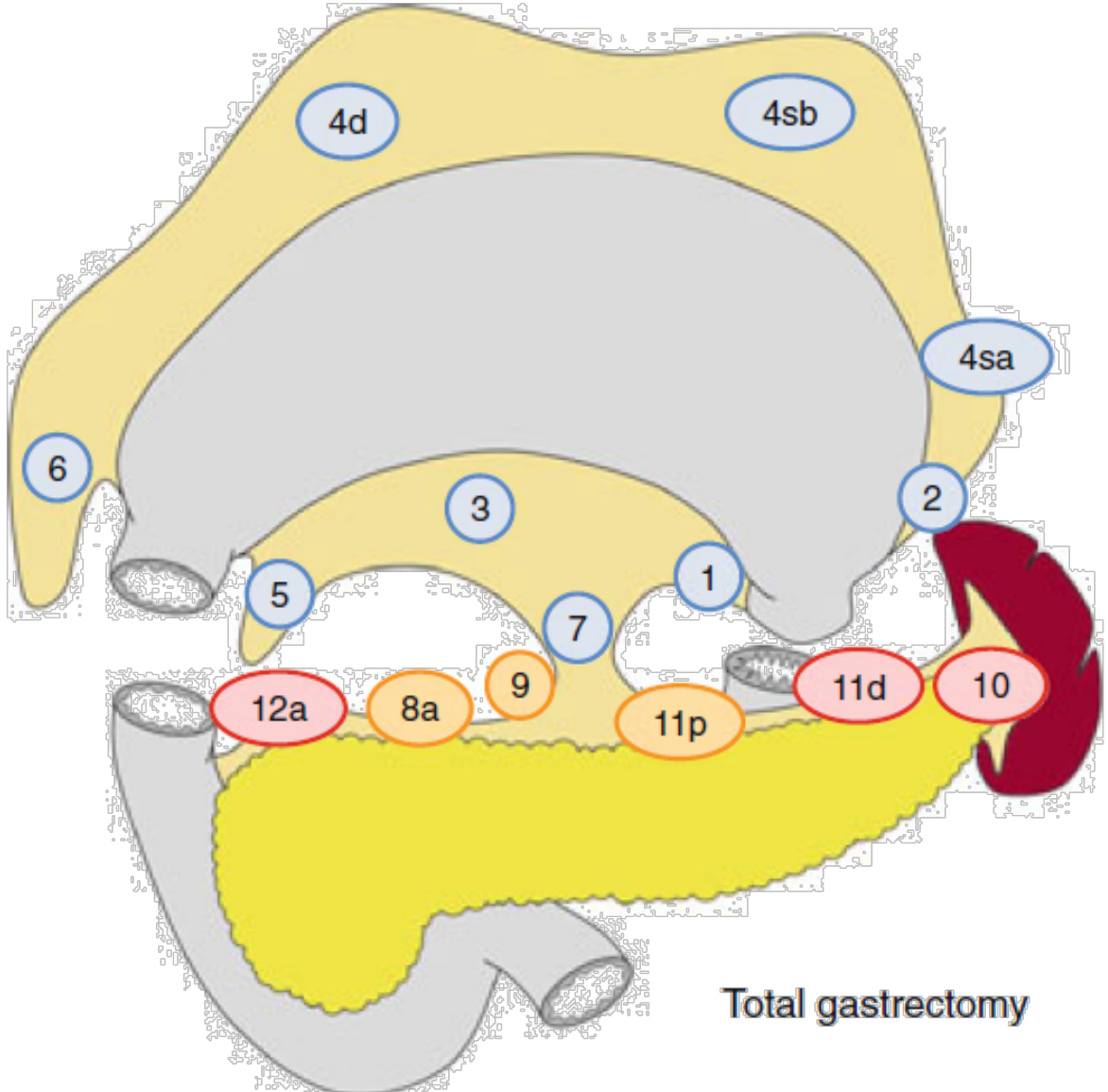
D2 Lymphadenectomy

D1

D1+

D2



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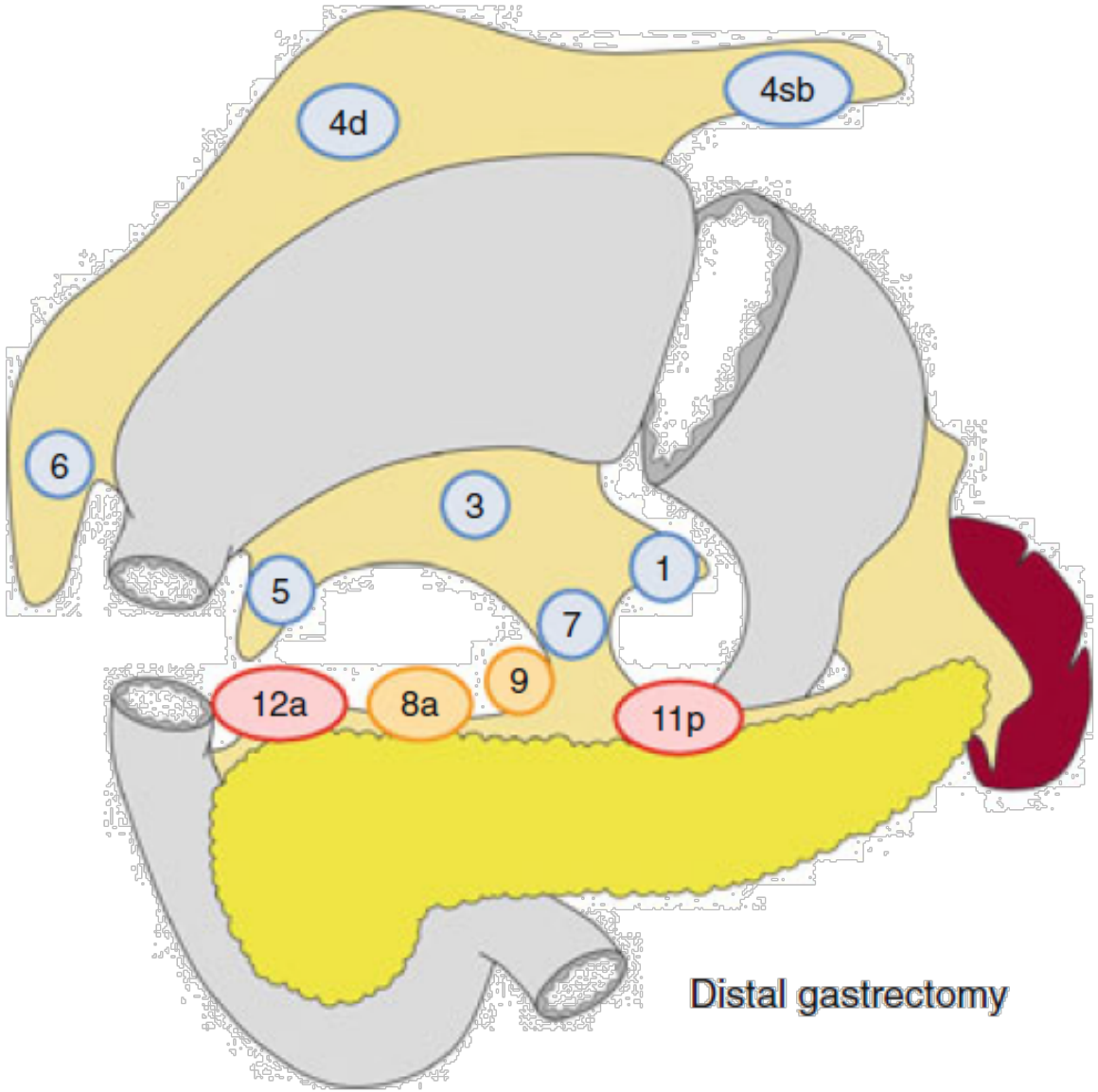
D2 Lymphadenectomy

D1

D1+

D2



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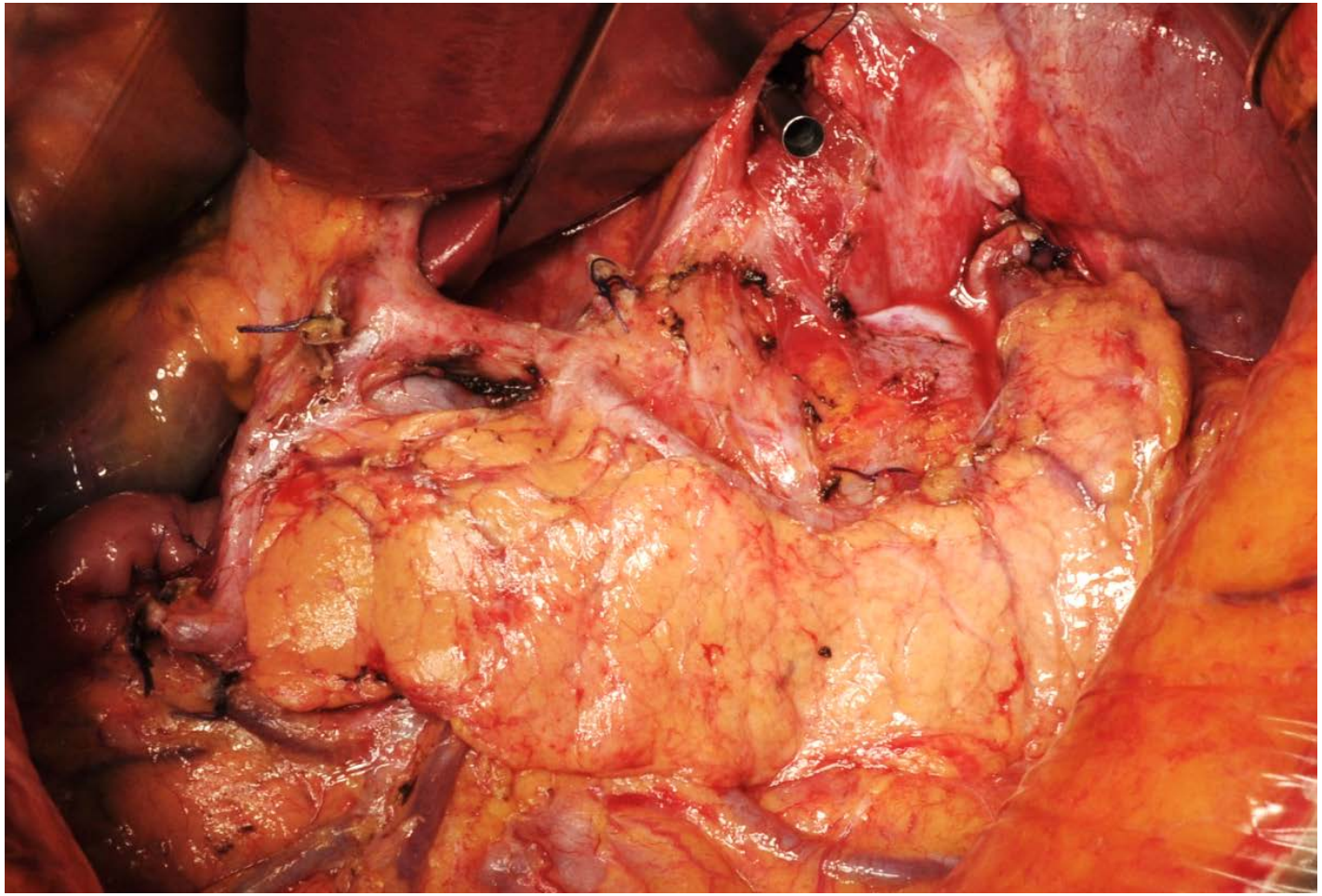
D2 Lymphadenectomy



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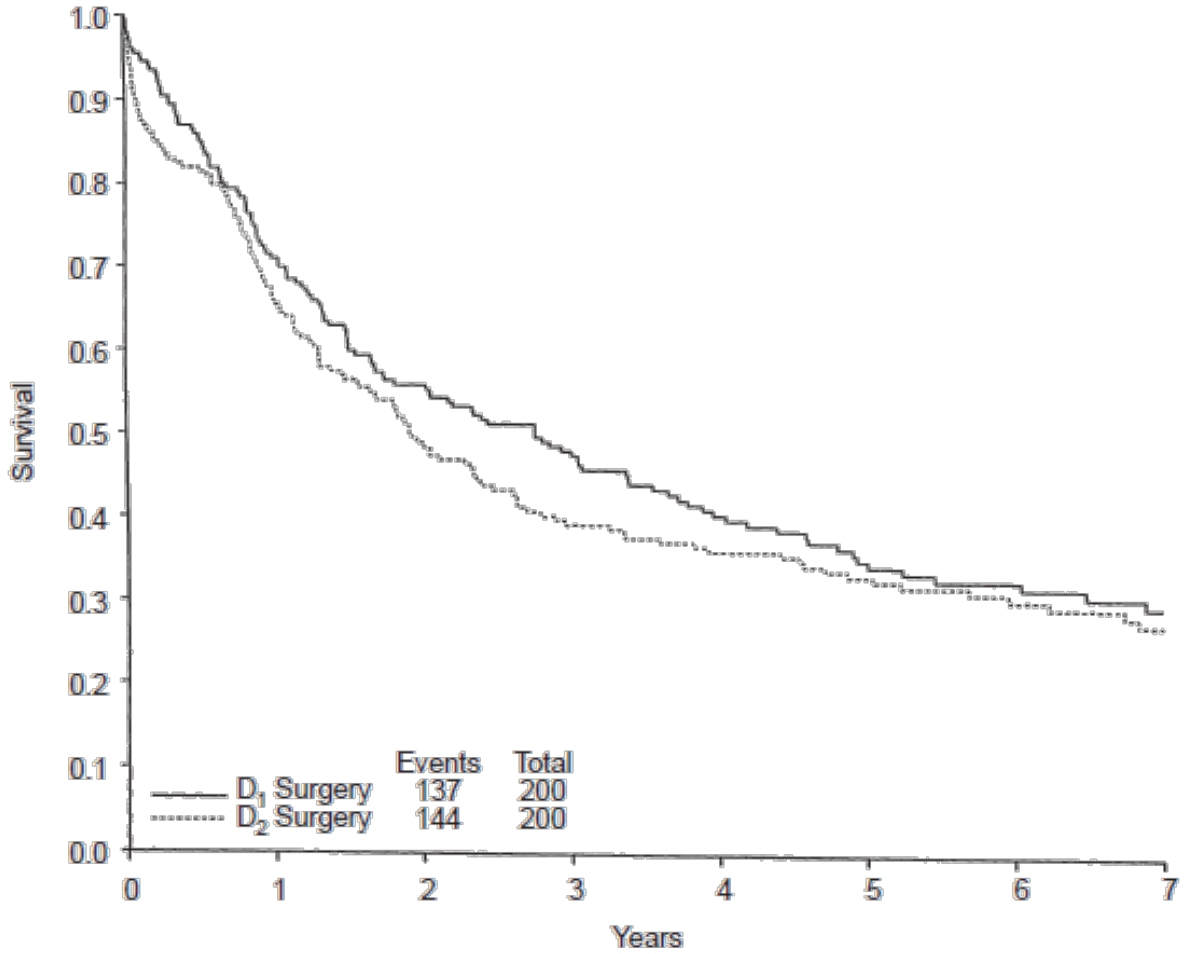
MRC D2 Study



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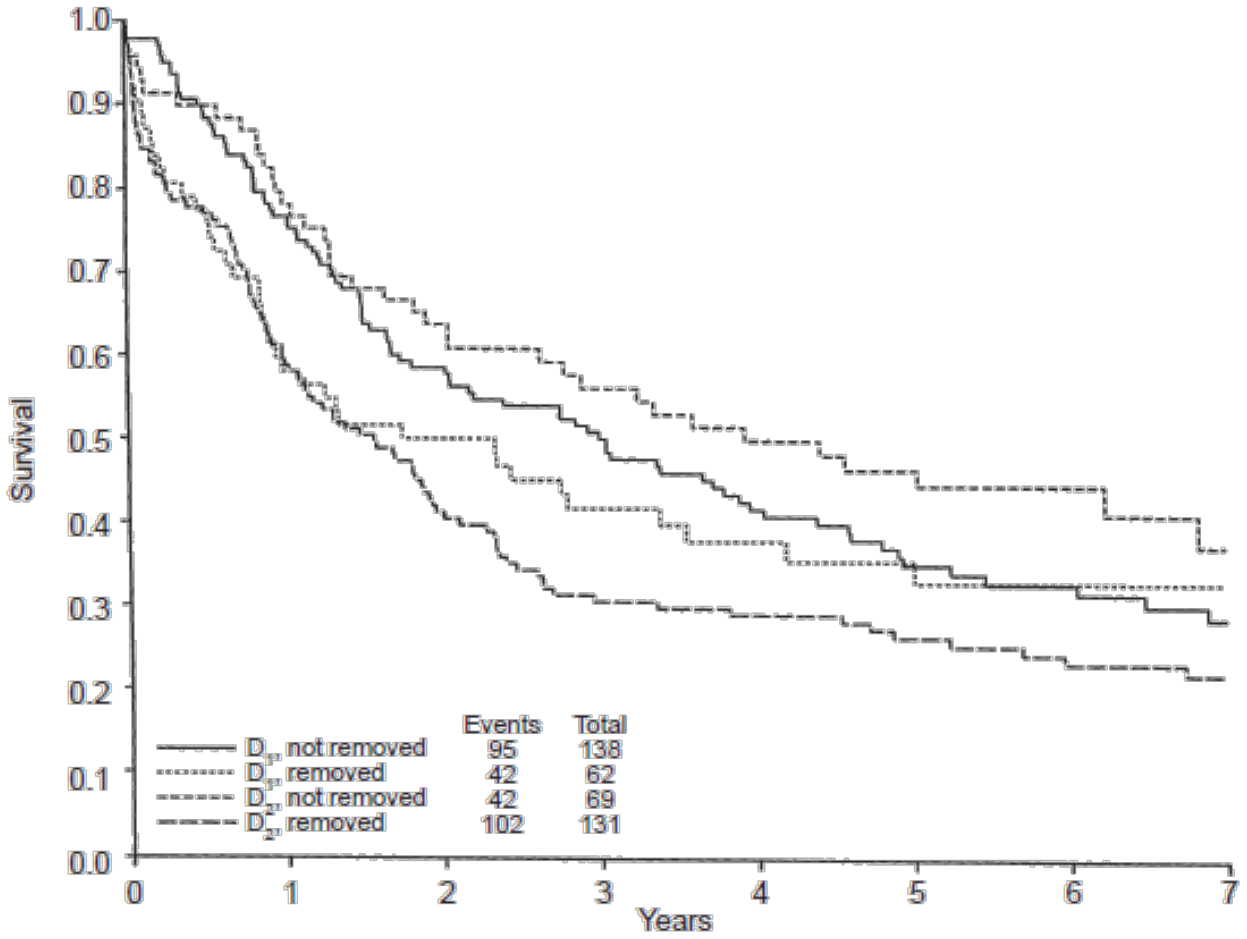
MRC D2 Study



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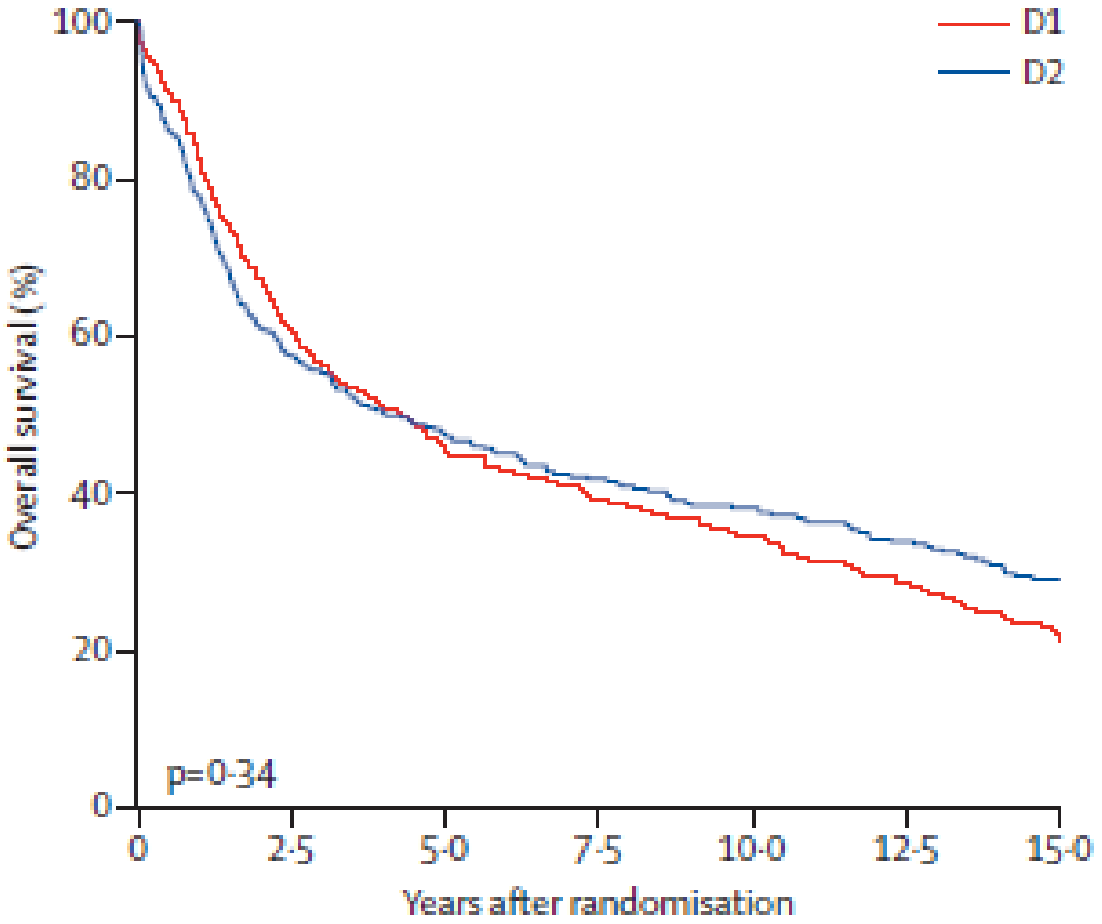
Dutch D2 Study



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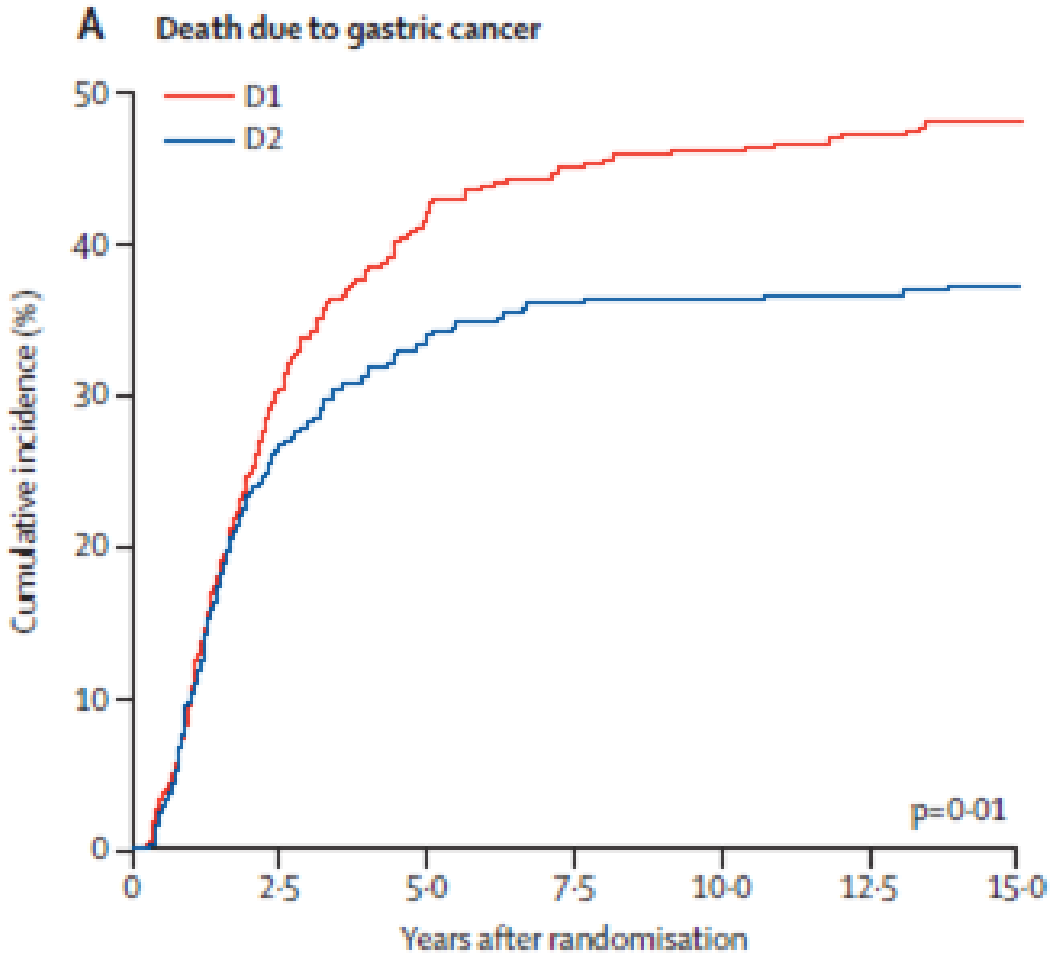
Dutch D2 Study



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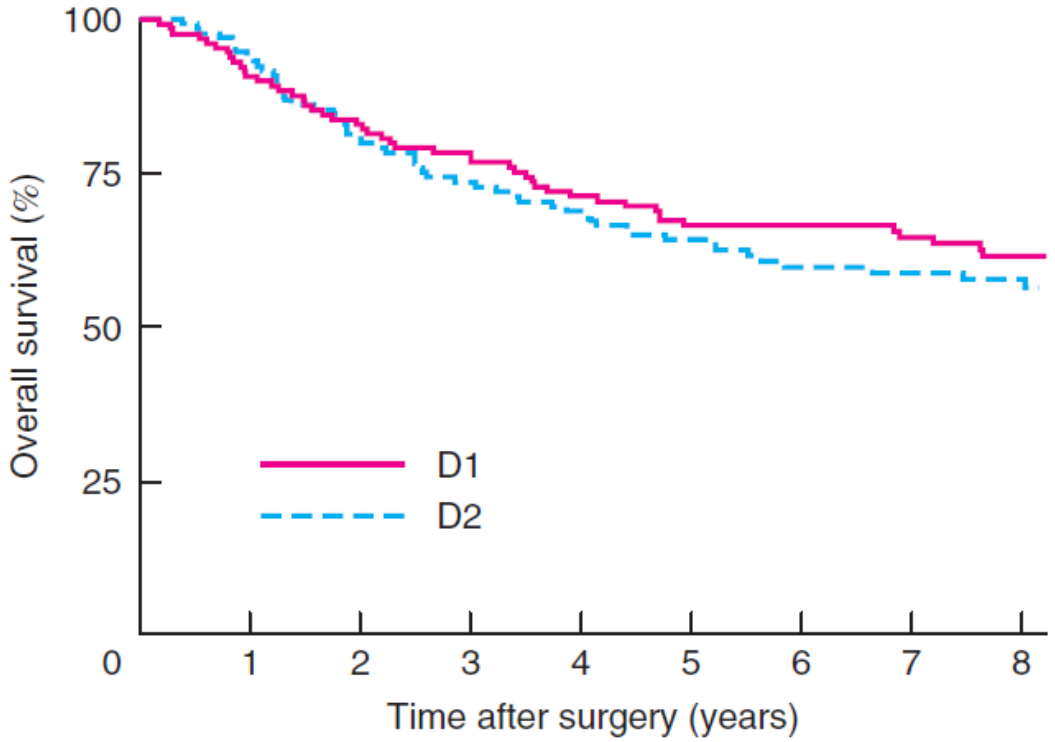
Italian D2 Study



No. at risk									
D1	129	117	107	100	91	82	75	67	49
D2	131	121	104	94	88	79	64	56	46

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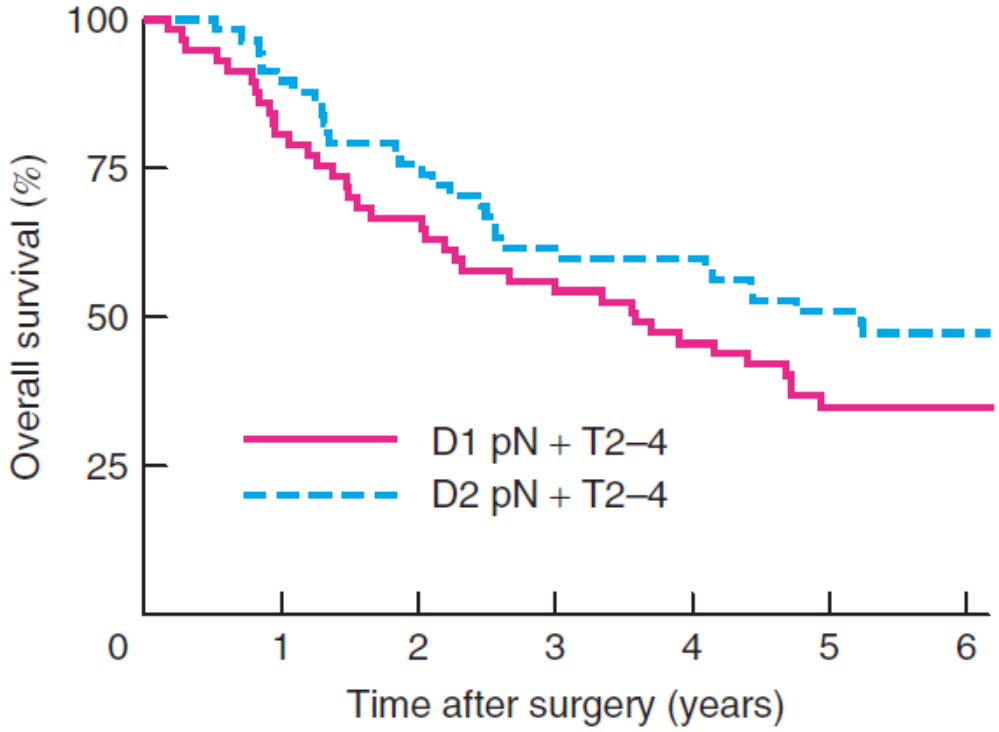
Italian D2 Study



No. at risk							
D1 pN + T2–4	57	46	38	32	26	19	16
D2 pN + T2–4	58	52	43	35	34	28	23

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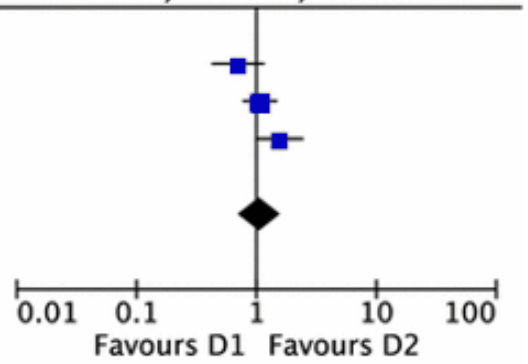
D2 Meta-Analysis

Study or Subgroup	D2 Events	D2 Total	D1 Events	D1 Total	Weight	Odds Ratio M-H, Random, 95% CI
All Stages	365	776	369	823	0.0%	1.09 [0.90, 1.33]
T1	124	164	159	195	28.9%	0.70 [0.42, 1.17]
T2	131	276	131	286	39.7%	1.07 [0.77, 1.49]
T3	53	205	40	218	31.4%	1.55 [0.98, 2.47]
Total (95% CI)		**645**		**699**	**100.0%**	**1.06 [0.72, 1.58]**
Total events	308		330			

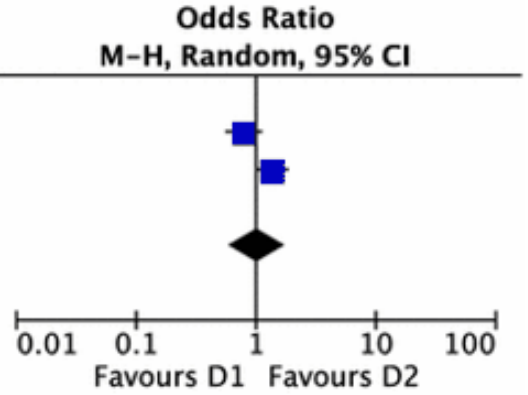
Heterogeneity: $Tau^2 = 0.07$; $Chi^2 = 5.11$, df = 2 (P = 0.08); $I^2 = 61\%$
Test for overall effect: Z = 0.31 (P = 0.76)



(a)

Study or Subgroup	D2 Events	D2 Total	D1 Events	D1 Total	Weight	Odds Ratio M-H, Random, 95% CI
All Stages	314	654	327	695	0.0%	1.04 [0.84, 1.29]
N0	191	281	224	307	48.8%	0.79 [0.55, 1.12]
N+	123	373	103	388	51.2%	1.36 [1.00, 1.86]
Total (95% CI)		**654**		**695**	**100.0%**	**1.04 [0.61, 1.78]**
Total events	314		327			

Heterogeneity: $Tau^2 = 0.12$; $Chi^2 = 5.17$, df = 1 (P = 0.02); $I^2 = 81\%$
Test for overall effect: Z = 0.15 (P = 0.88)



(b)

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Beyond the D2

- Splenectomy → no ***
- Distal pancreatectomy → no
- Bursectomy → no
- D2 with para-aortic lymphadenectomy → no

*** consider in serosal positive disease when primary is located on upper third of greater curve

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Laparoscopic gastrectomy

- **Less pain, reduced blood loss, shorter hospital stay, quicker recovery**
- No differences in operative mortality
- No differences in oncologic outcomes in early gastric cancer
- Long term results not known for advanced gastric cancer

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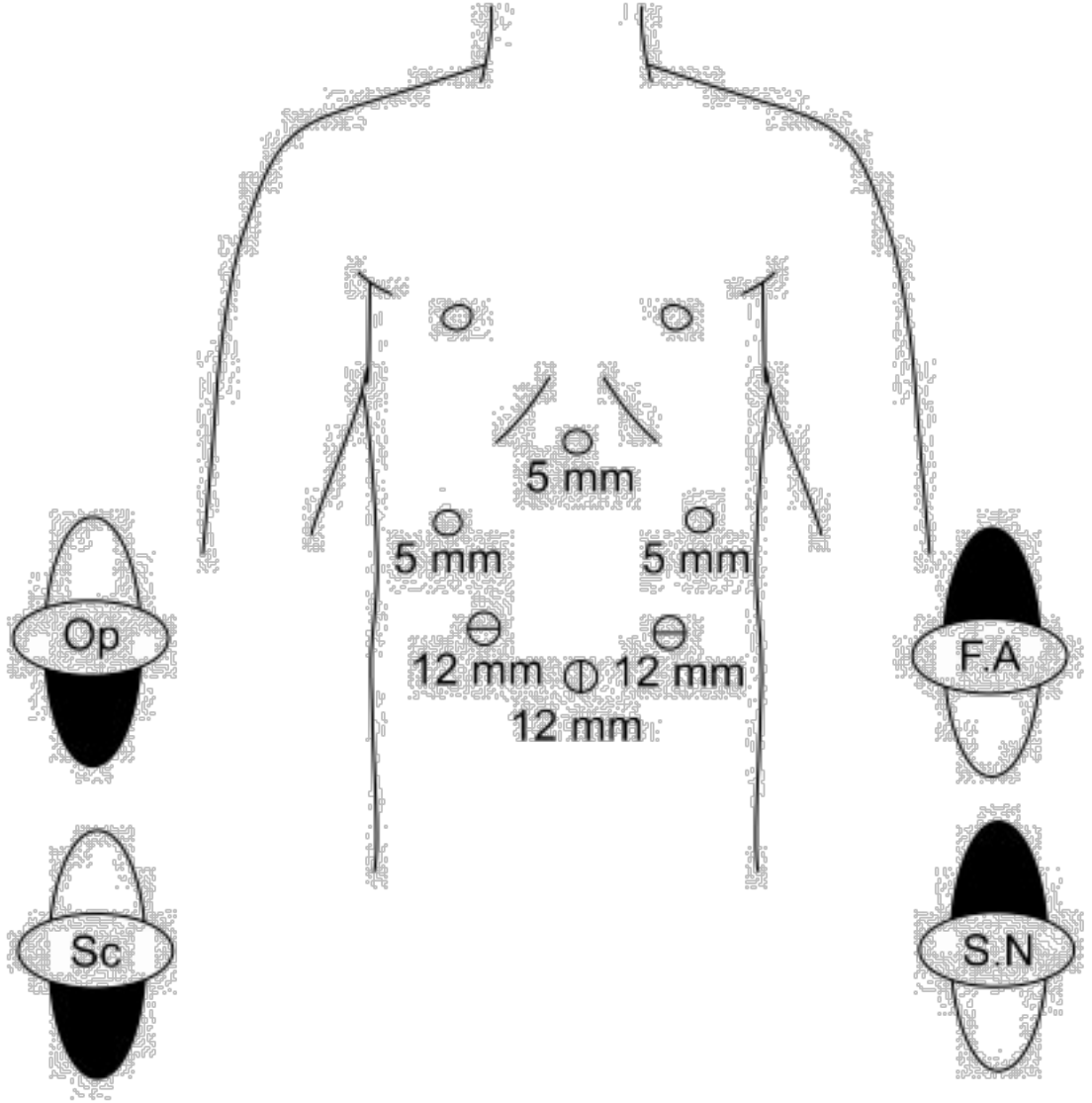
Laparoscopic gastrectomy

- Umbilical camera port
- Subxyphoid liver retractor
- Energy device (ultrasonic dissection)
- 5-6 cm Pfannesteil for retrieval
- Intracorporeal suturing



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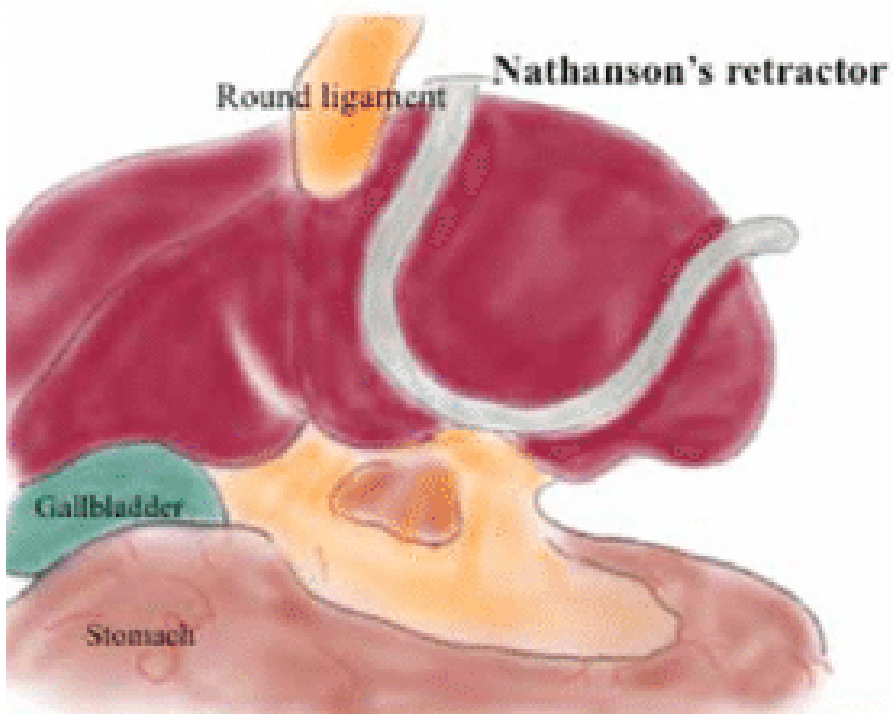
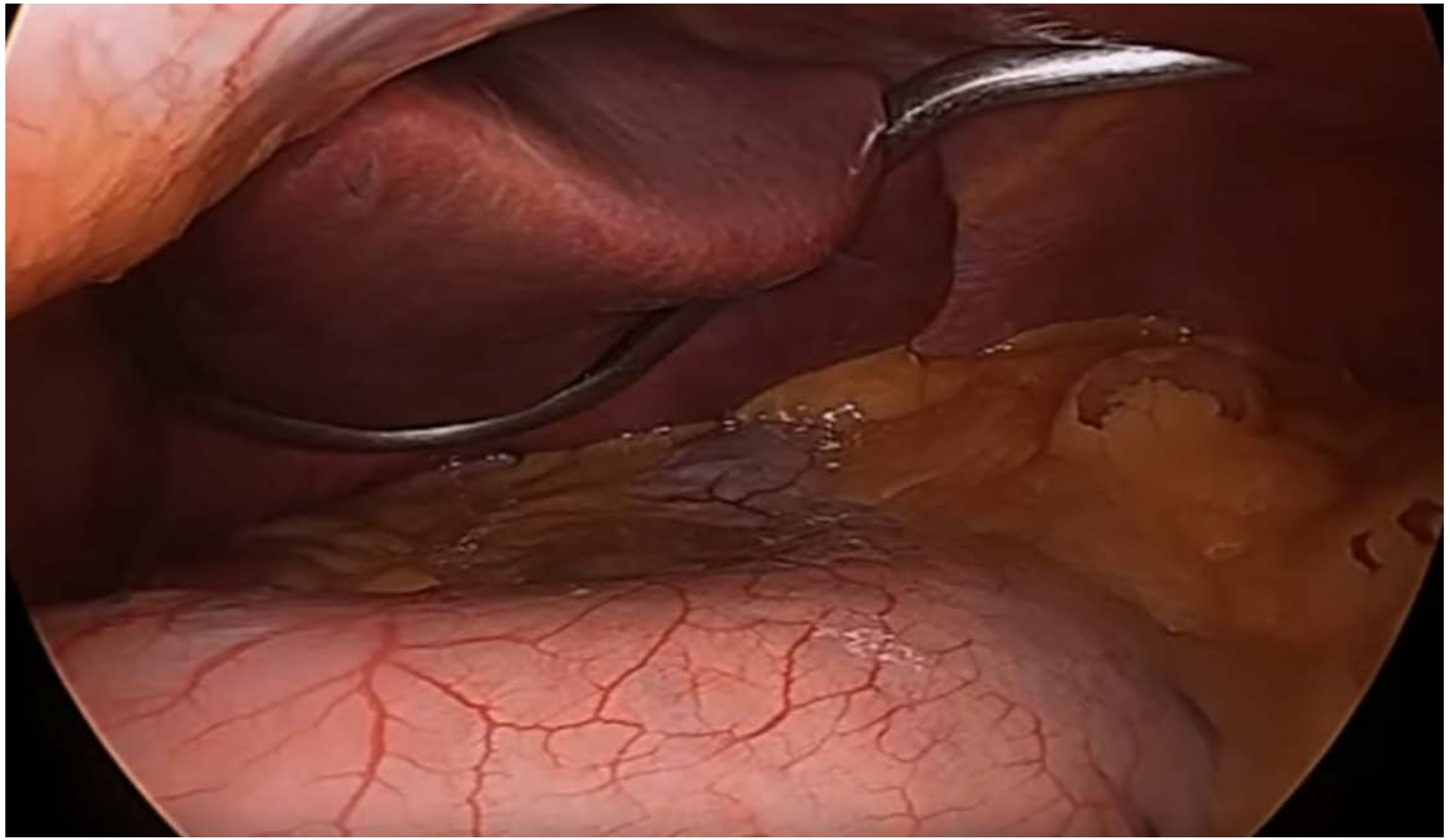
Laparoscopic gastrectomy





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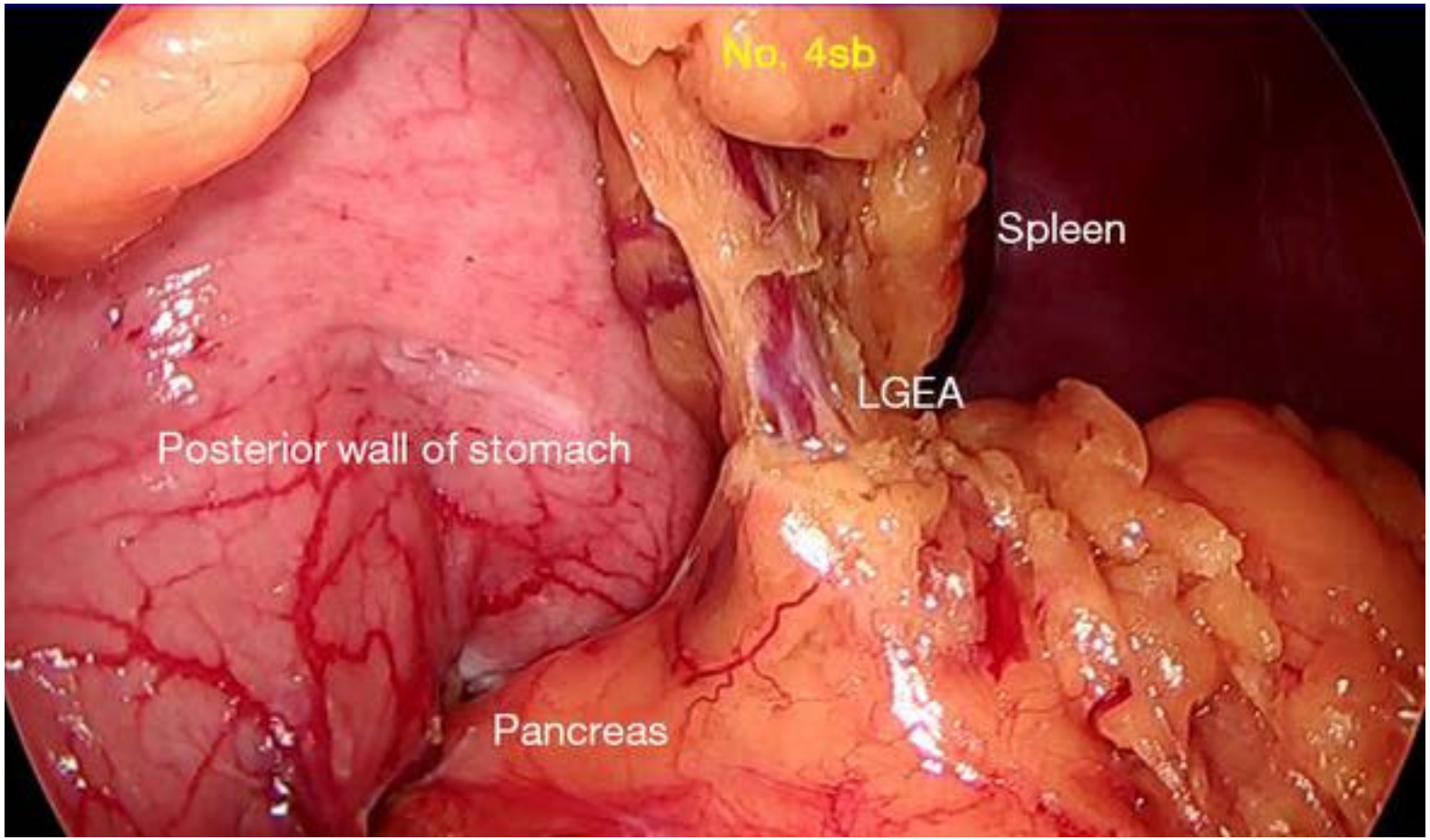
Laparoscopic gastrectomy

- Divide omentum off transverse colon
- Retract the greater curvature towards anterior abdominal wall
- Start with LGEV + LGEA (4sb nodes)



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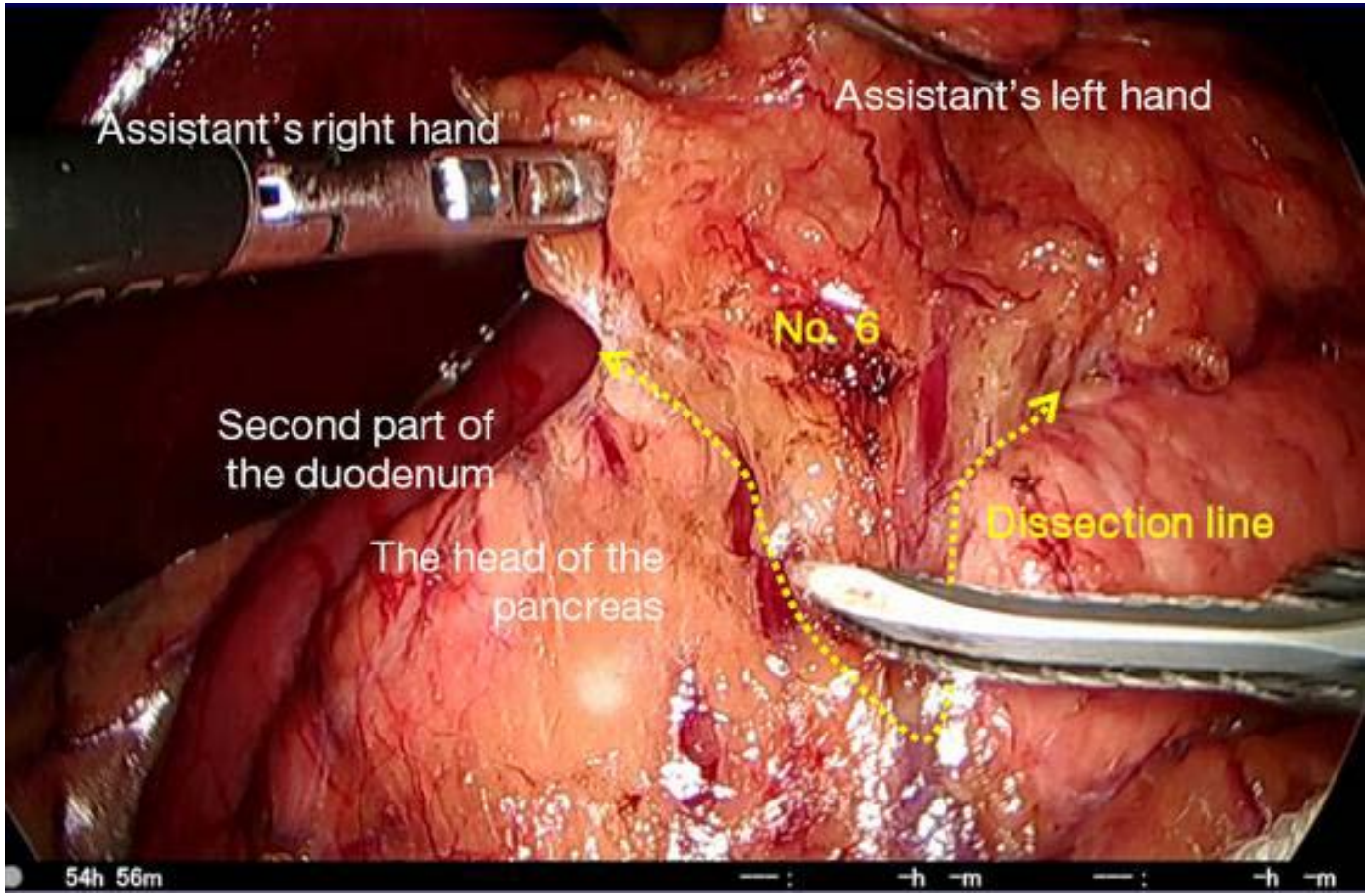
Laparoscopic gastrectomy

- Right Gastroepiploic dissection (st 6)
- Continue behind duodenum along GDA to right gastric
- Divide duodenum



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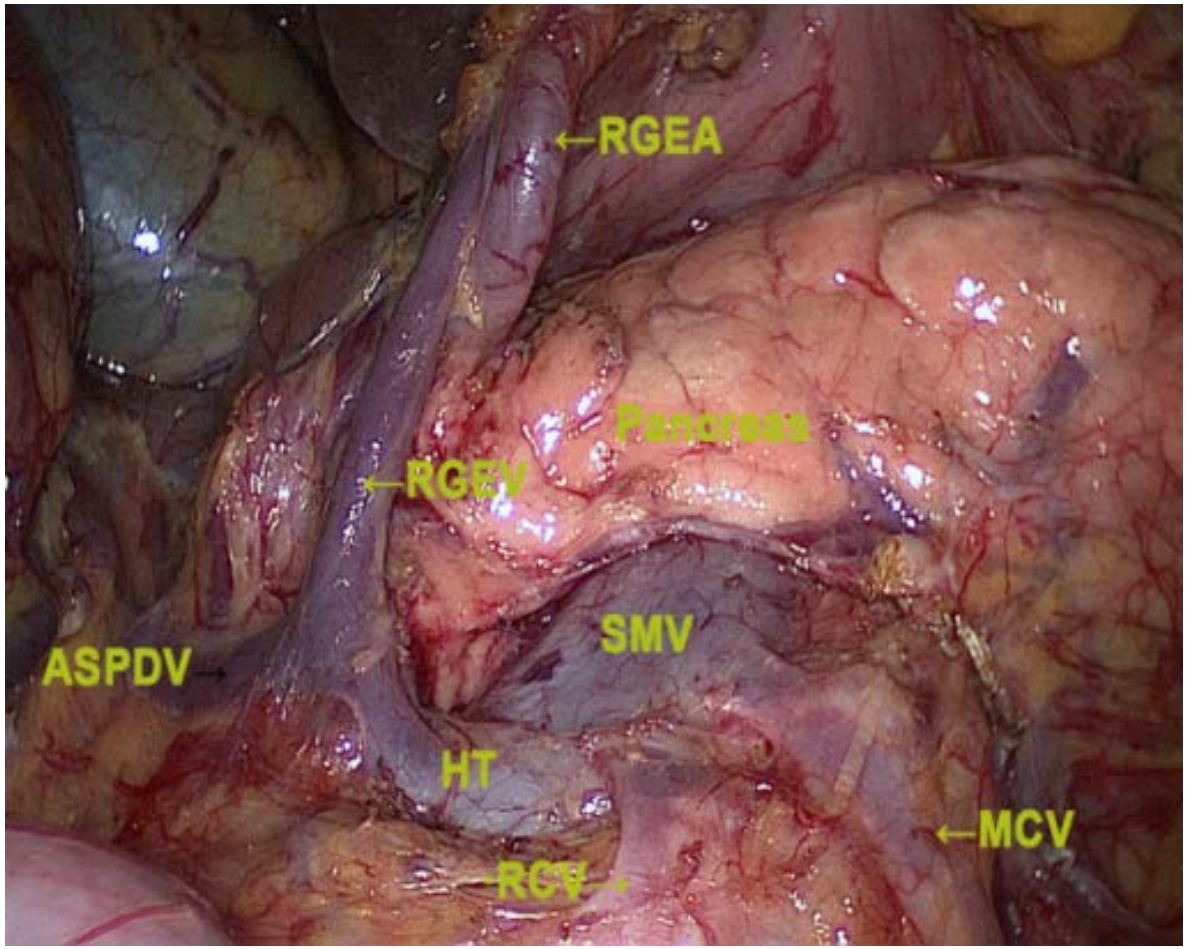
Laparoscopic gastrectomy



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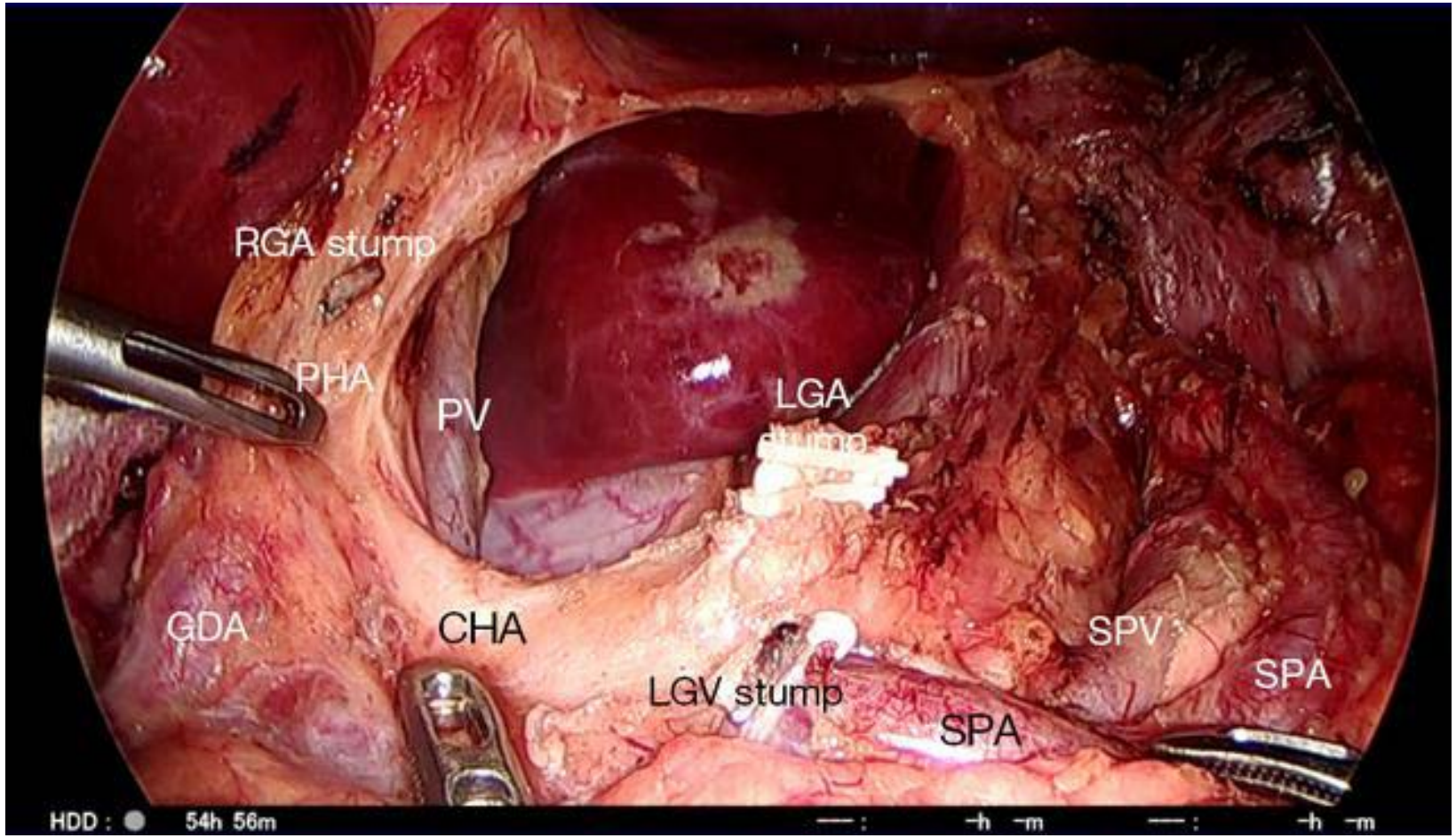
Laparoscopic gastrectomy



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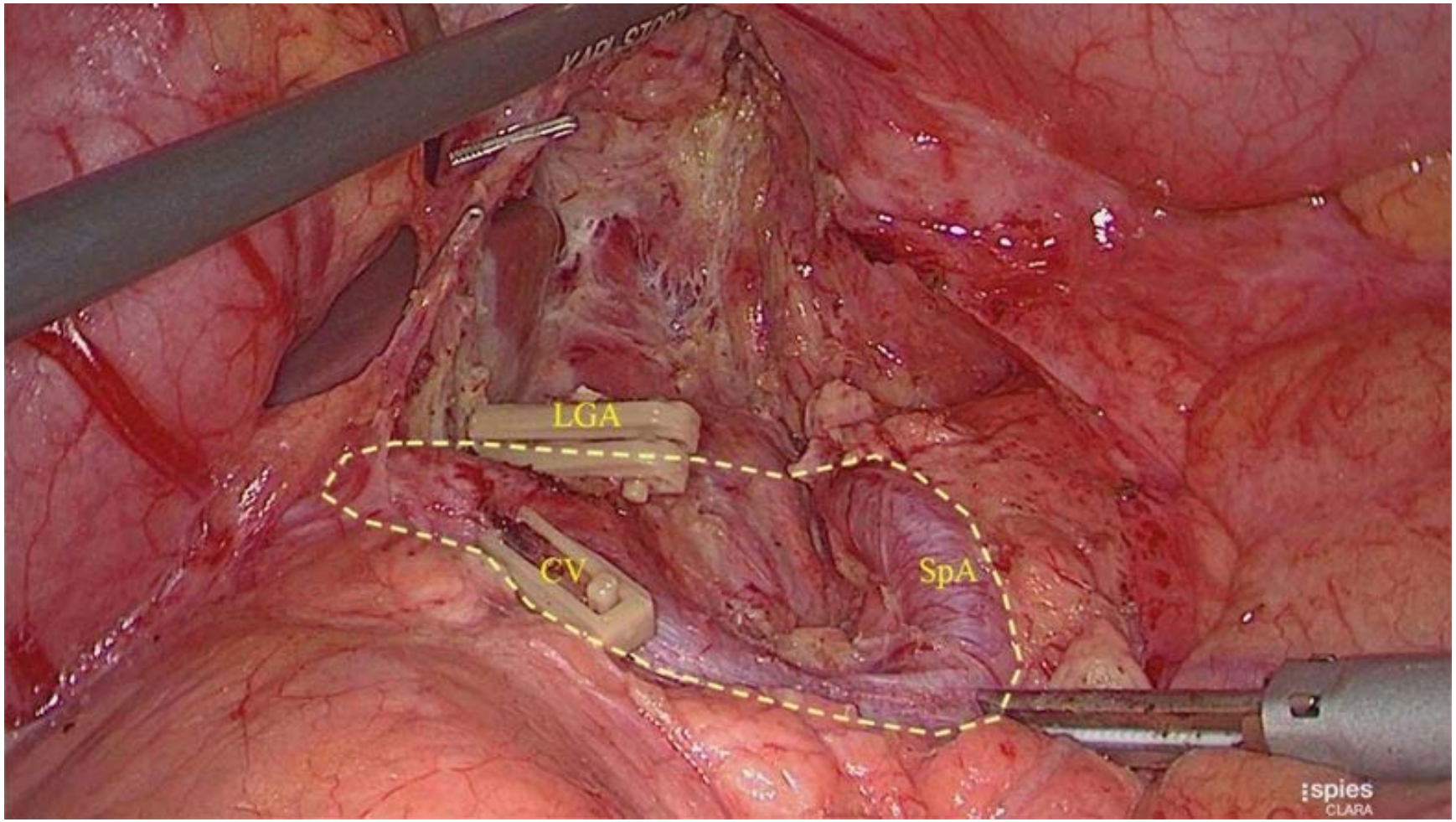
Laparoscopic gastrectomy



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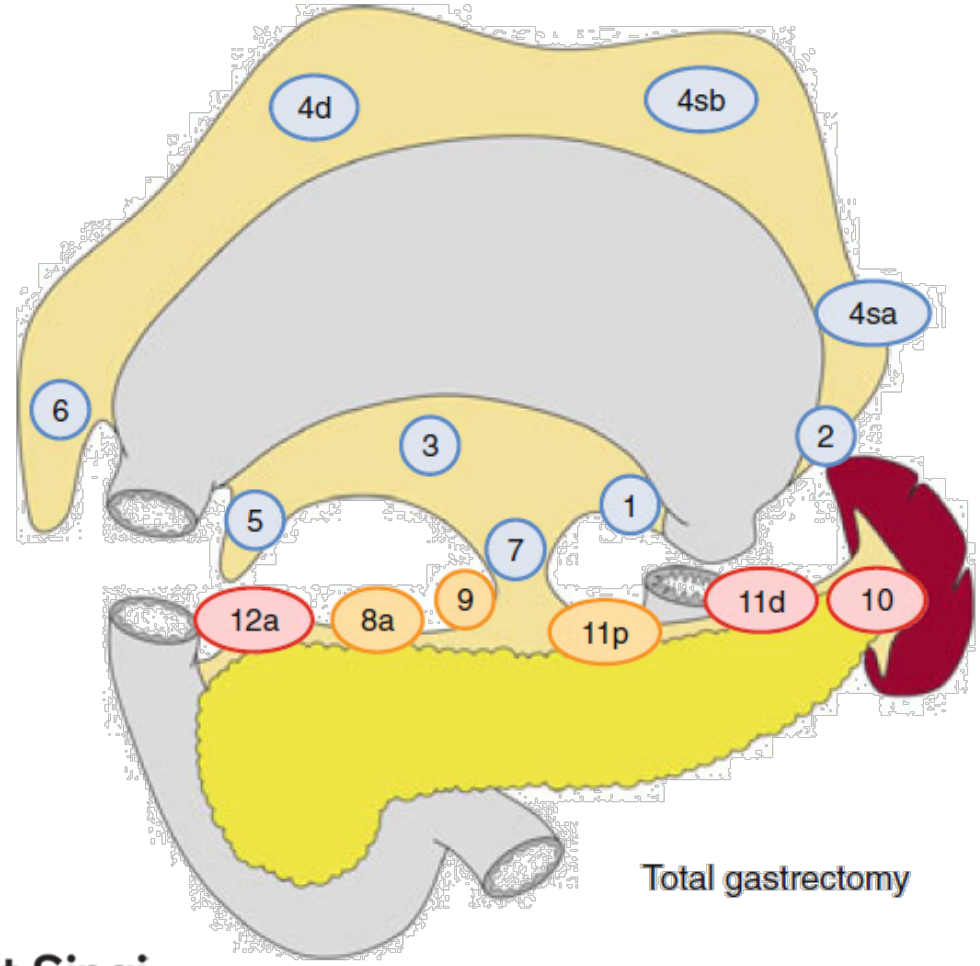
D2 Lymphadenectomy

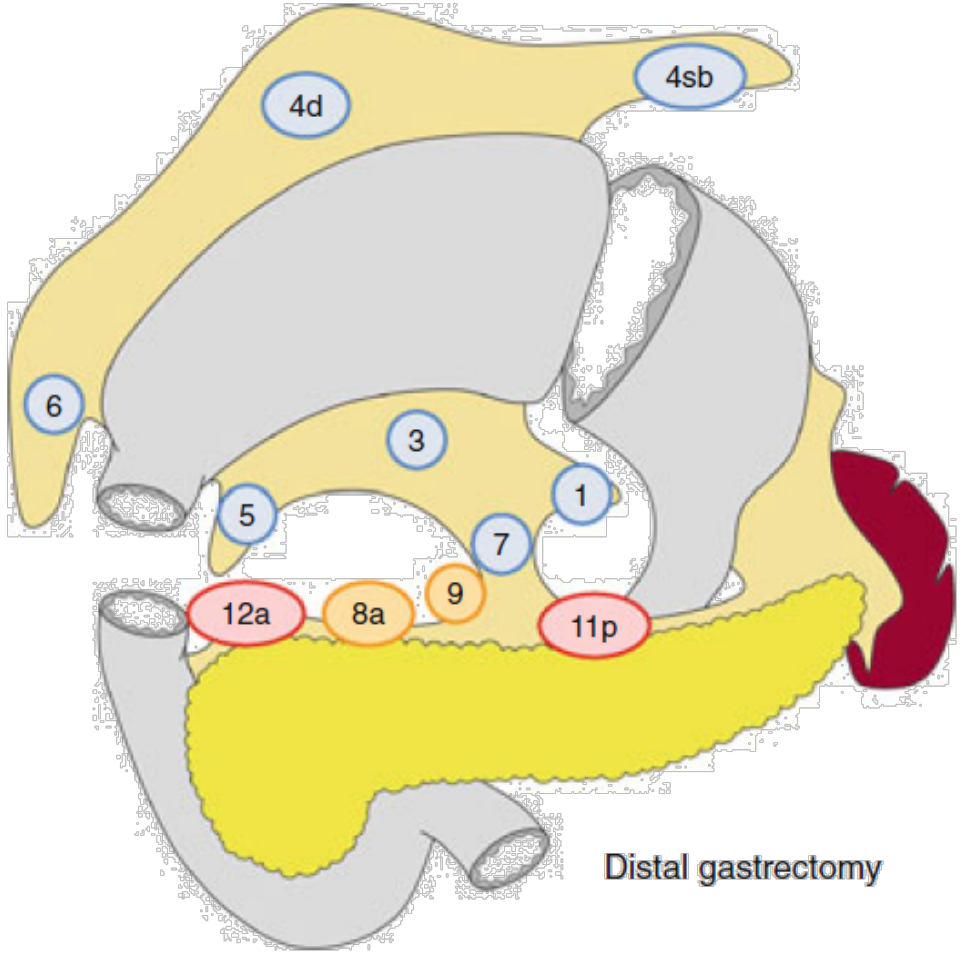
D1

D1+

D2



Total gastrectomy



Distal gastrectomy

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Robotic Surgery

- No differences in outcomes between patients who undergo laparoscopic and robotic gastrectomy for gastric cancer
- Robotic surgery is associated with:

  INCREASED COST

  LONGER OPERATIONS

  NO DIFFERENCE IN SAFETY

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Management

Metastatic (M1)

- Systemic therapy or best supportive care
- Noncurative gastrectomy have no survival benefit
- Palliative interventions
  - Surgery
  - Endoscopy
  - Radiation

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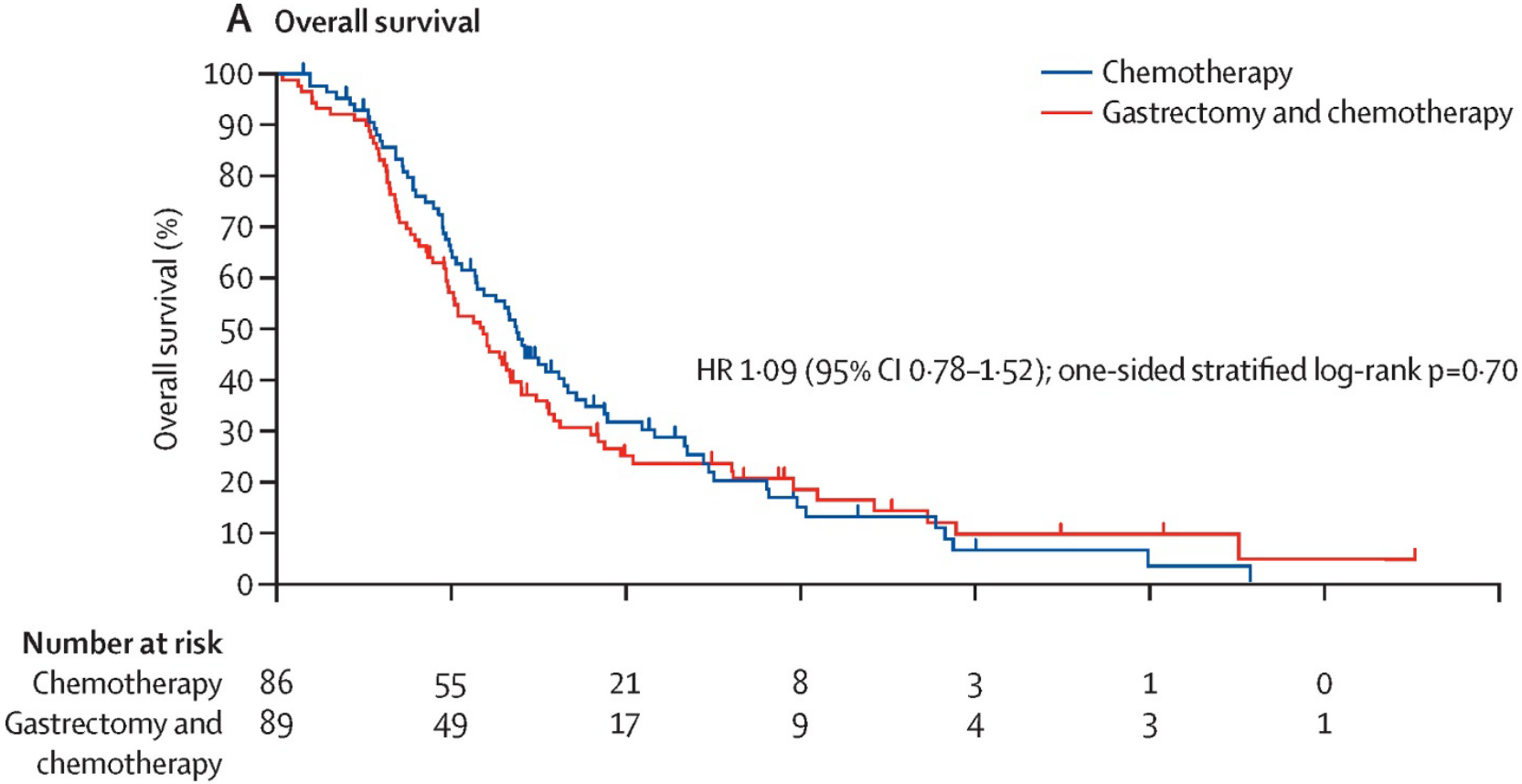
Metastatic gastric cancer



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M1: Cyt +

- Positive peritoneal cytology that converts to negative peritoneal cytology associated with improved survival

- No evidence to guide treatment in these patients but there may be a role for gastrectomy in carefully selected patients

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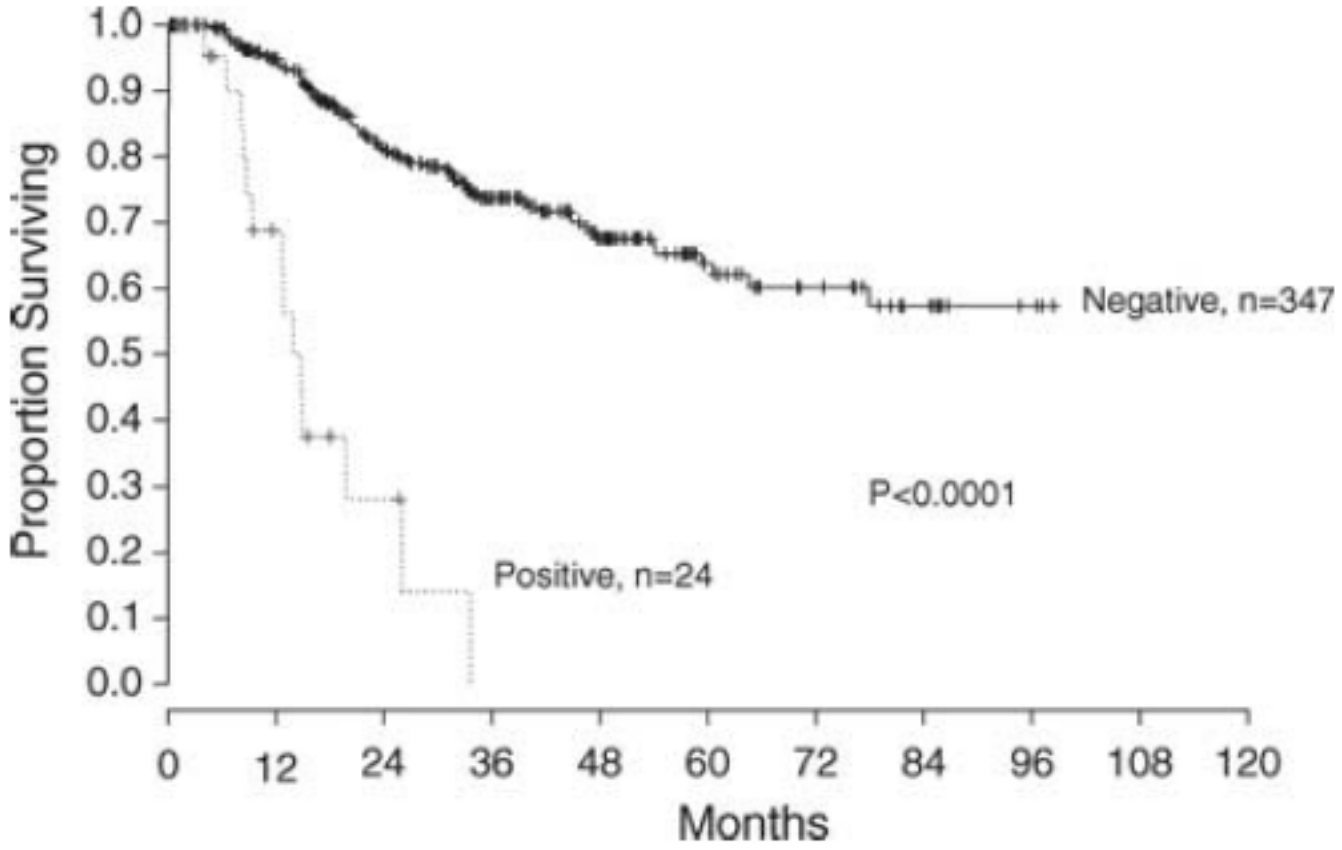
Cytology +



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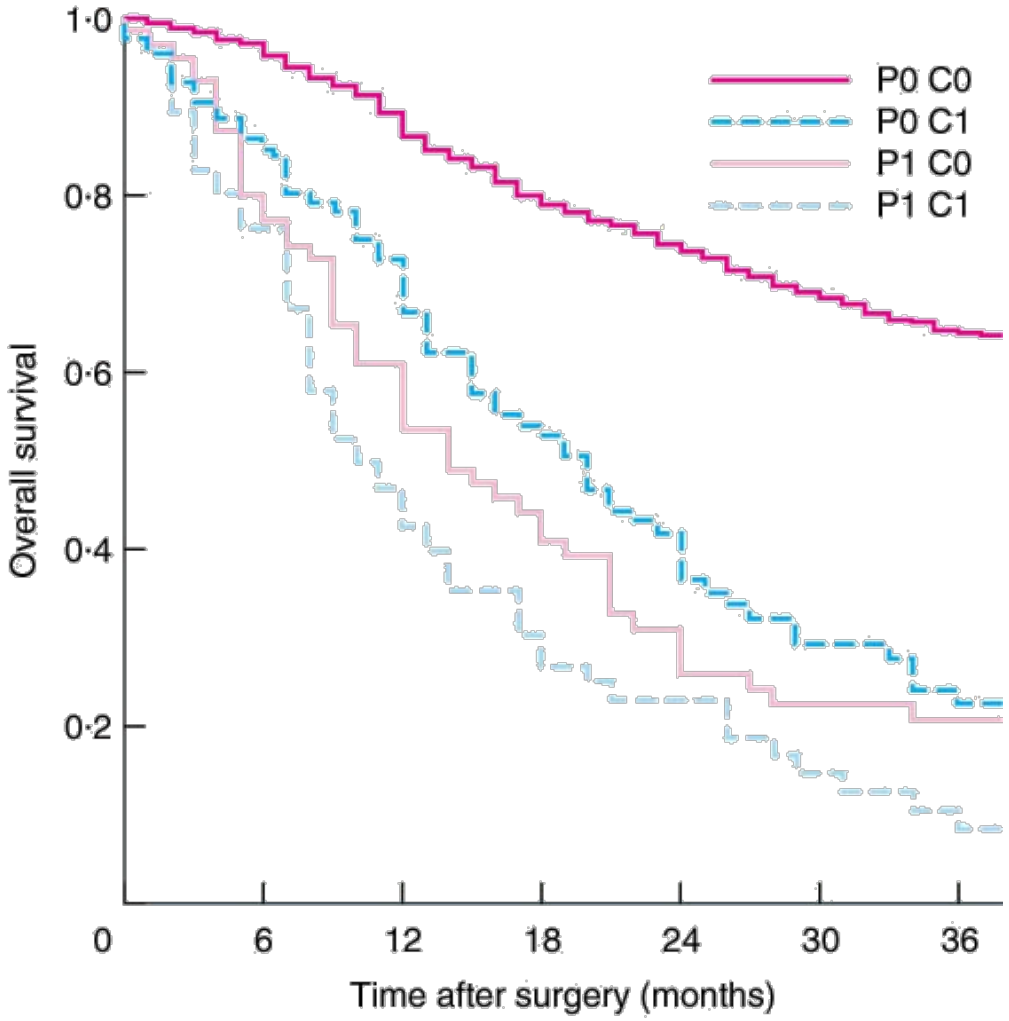
Cytology +



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Summary

- Improving outcomes for gastric cancer patients must involve improving quality of surgery
  - < 5% operative mortality
  - 5% positive margin rate
  - >16 LN retrieved
- Long term oncologic outcomes lacking for laparoscopic gastrectomy
- Noncurative gastectomy in the metastatic setting is to be avoided

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gastriccancer.ca

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Mygutfeeling.ca

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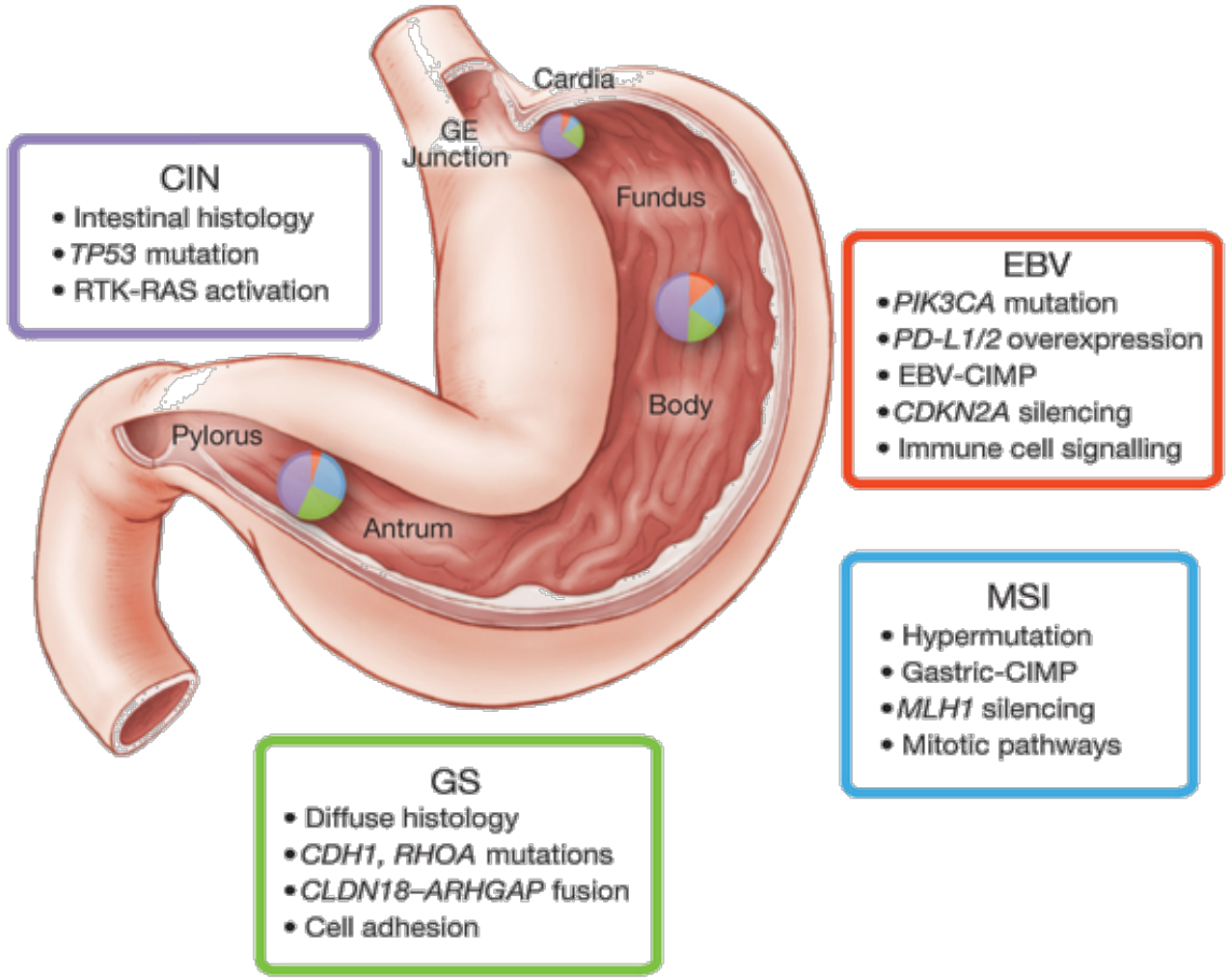
Future directions



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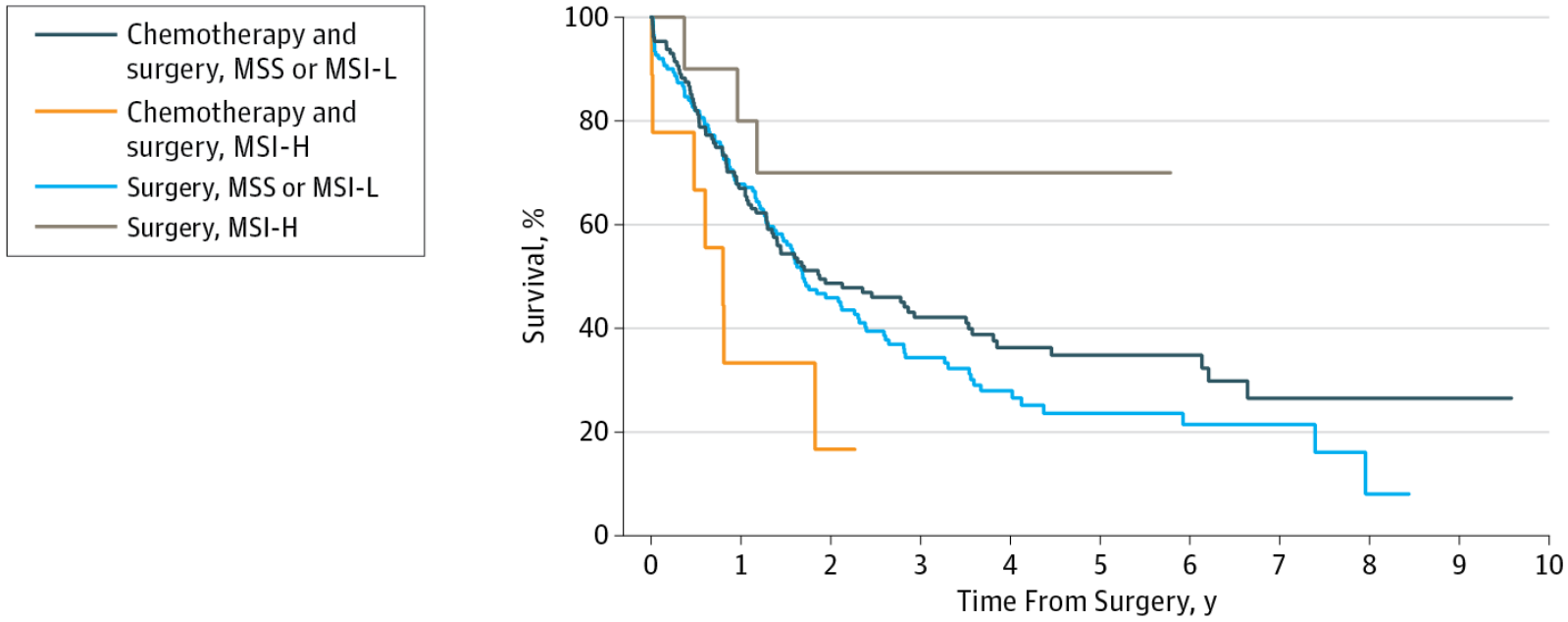
MSI High



No. at risk

Chemotherapy and surgery, MSI-negative patients	129	85	58	42	27	22	15	6	3	1
Chemotherapy and surgery, MSI-positive patients	9	3	1							
Surgery, MSI-negative patients	151	100	58	37	21	13	9	7	1	
Surgery, MSI-positive patients	10	8	6	3	1	1				

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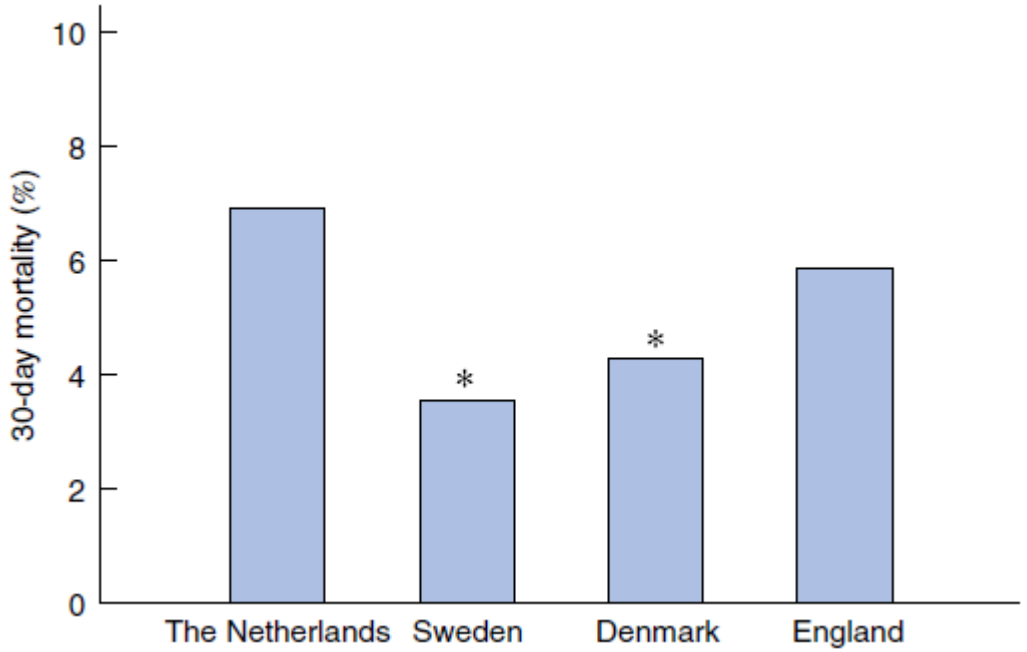
Outcomes



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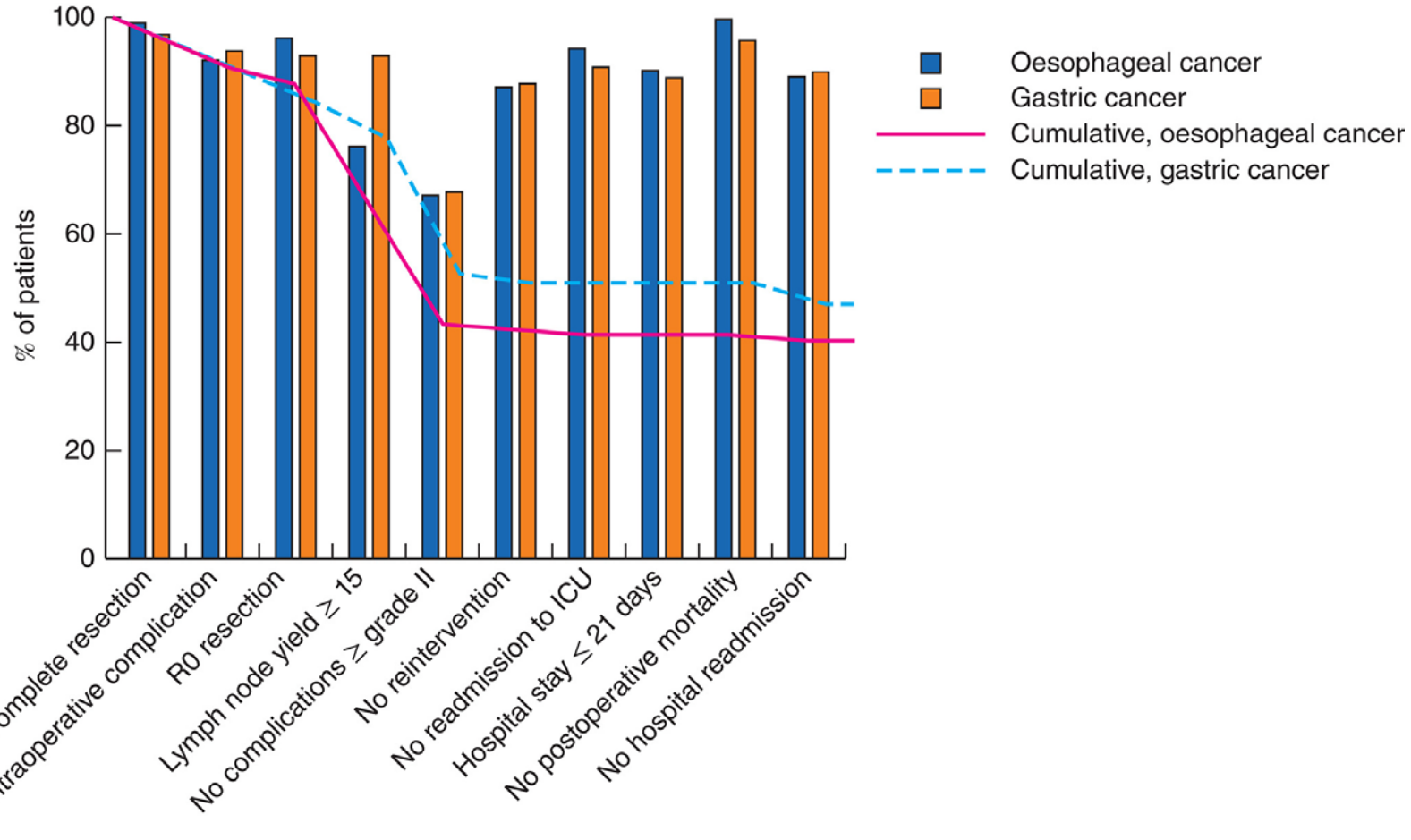
Outcomes



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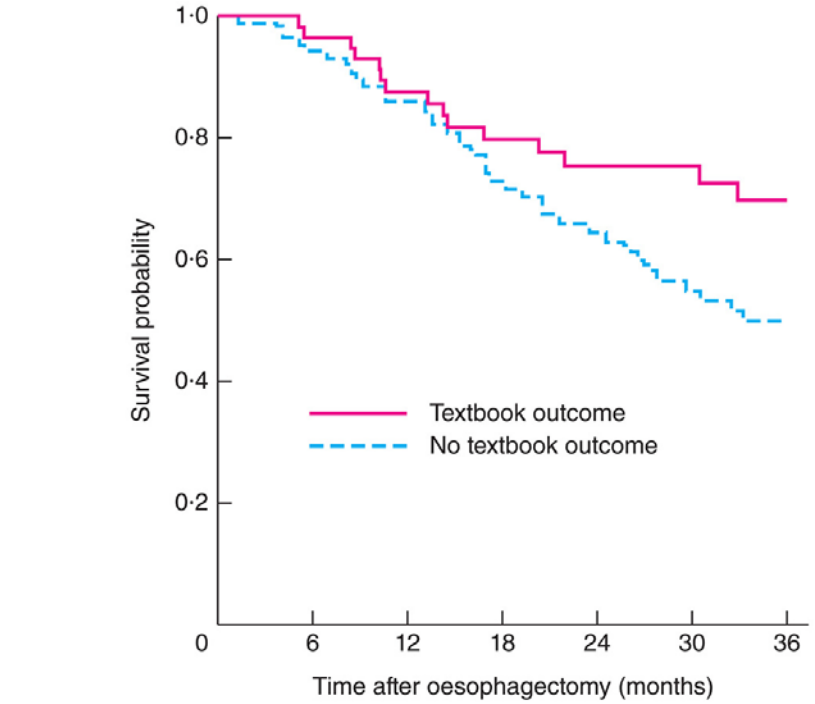
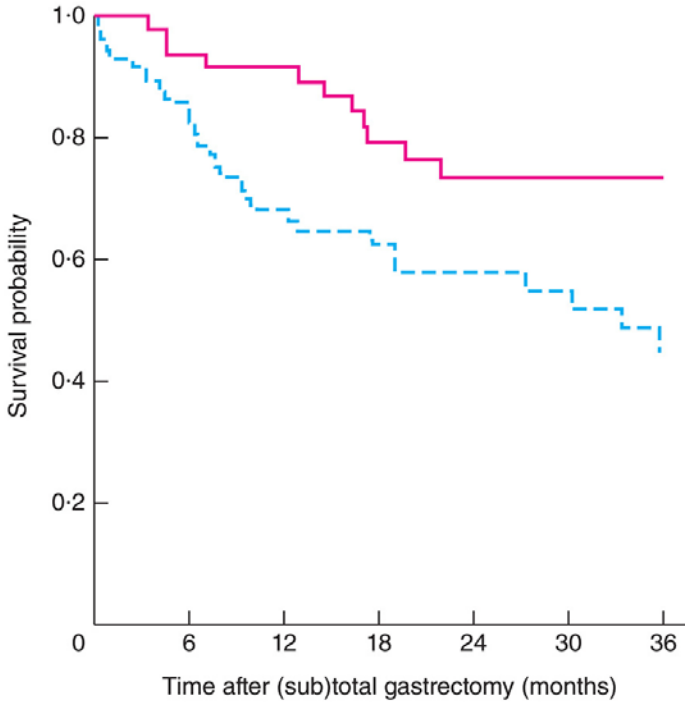
Outcomes



No. at risk							
Textbook outcome	58	56	45	39	31	27	24
No textbook outcome	86	81	68	54	42	34	27

a Oesophageal cancer



No. at risk							
Textbook outcome	48	45	40	30	23	19	15
No textbook outcome	57	47	37	30	22	19	12

b Gastric cancer

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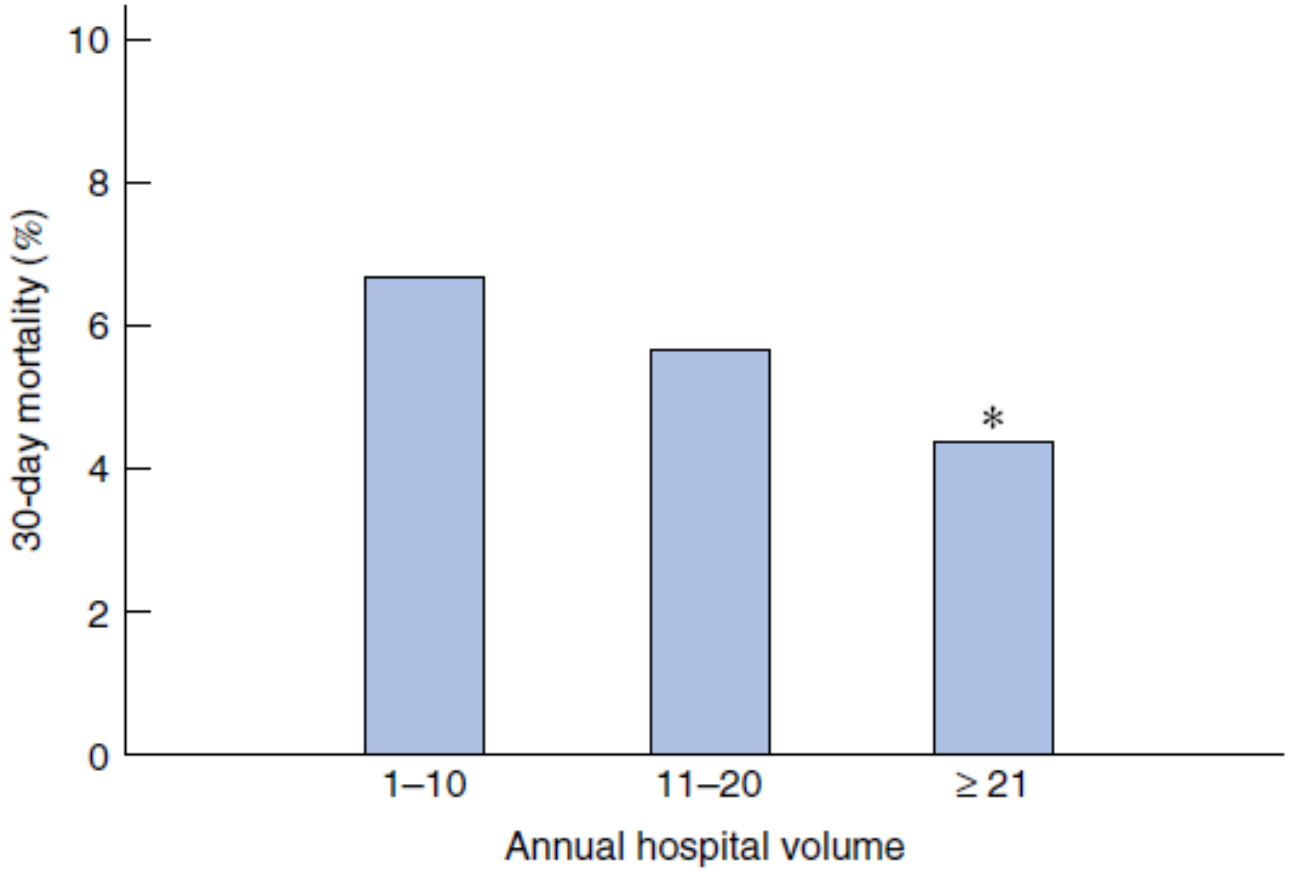
Volume + Outcome



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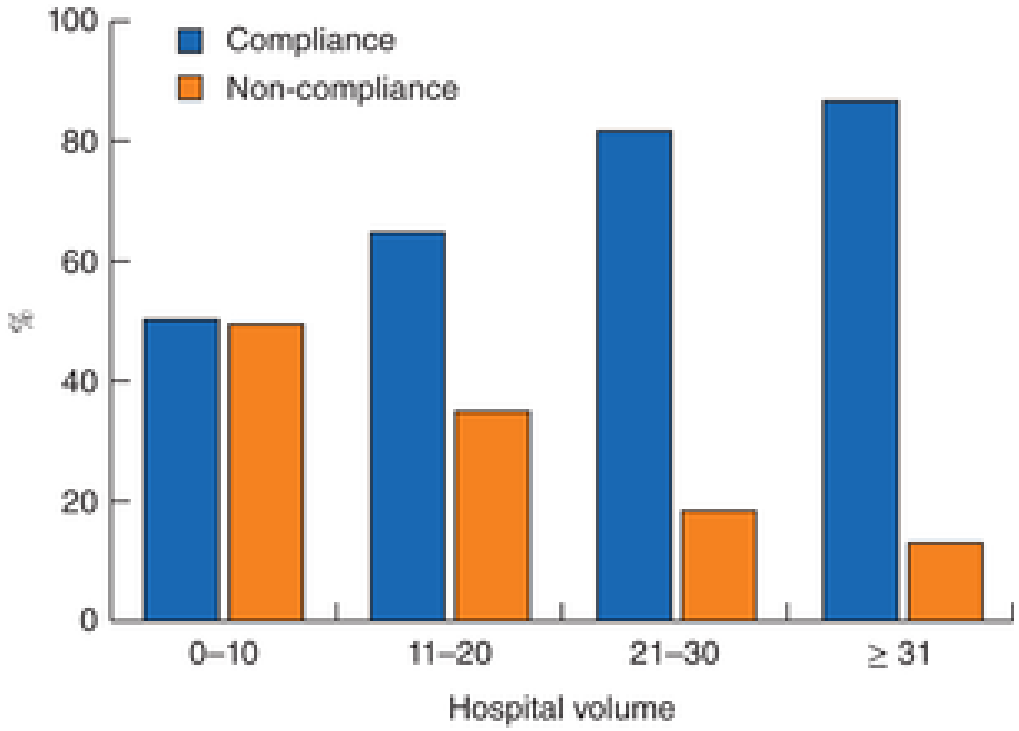
Volume + Outcome



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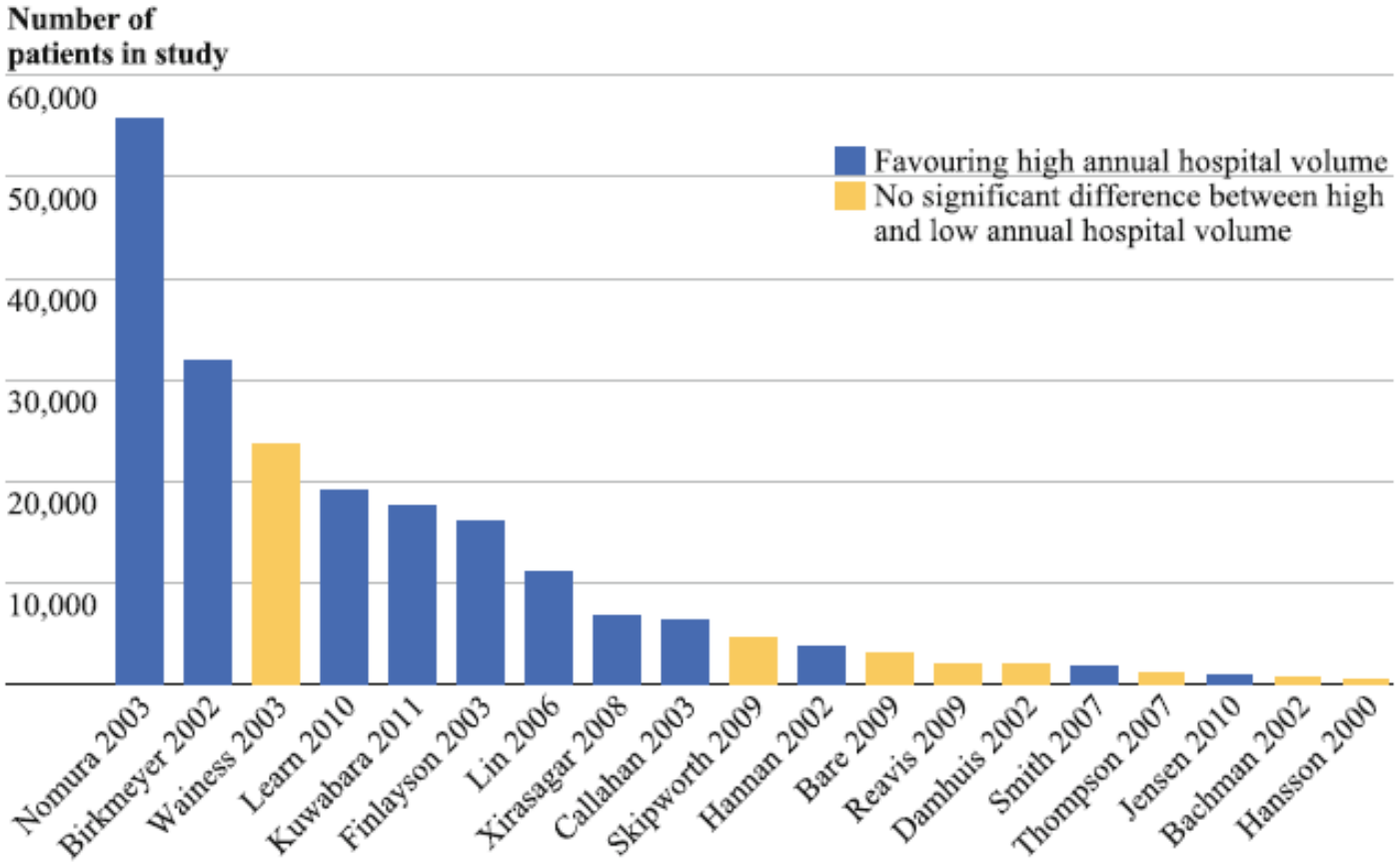
Volume + Outcome



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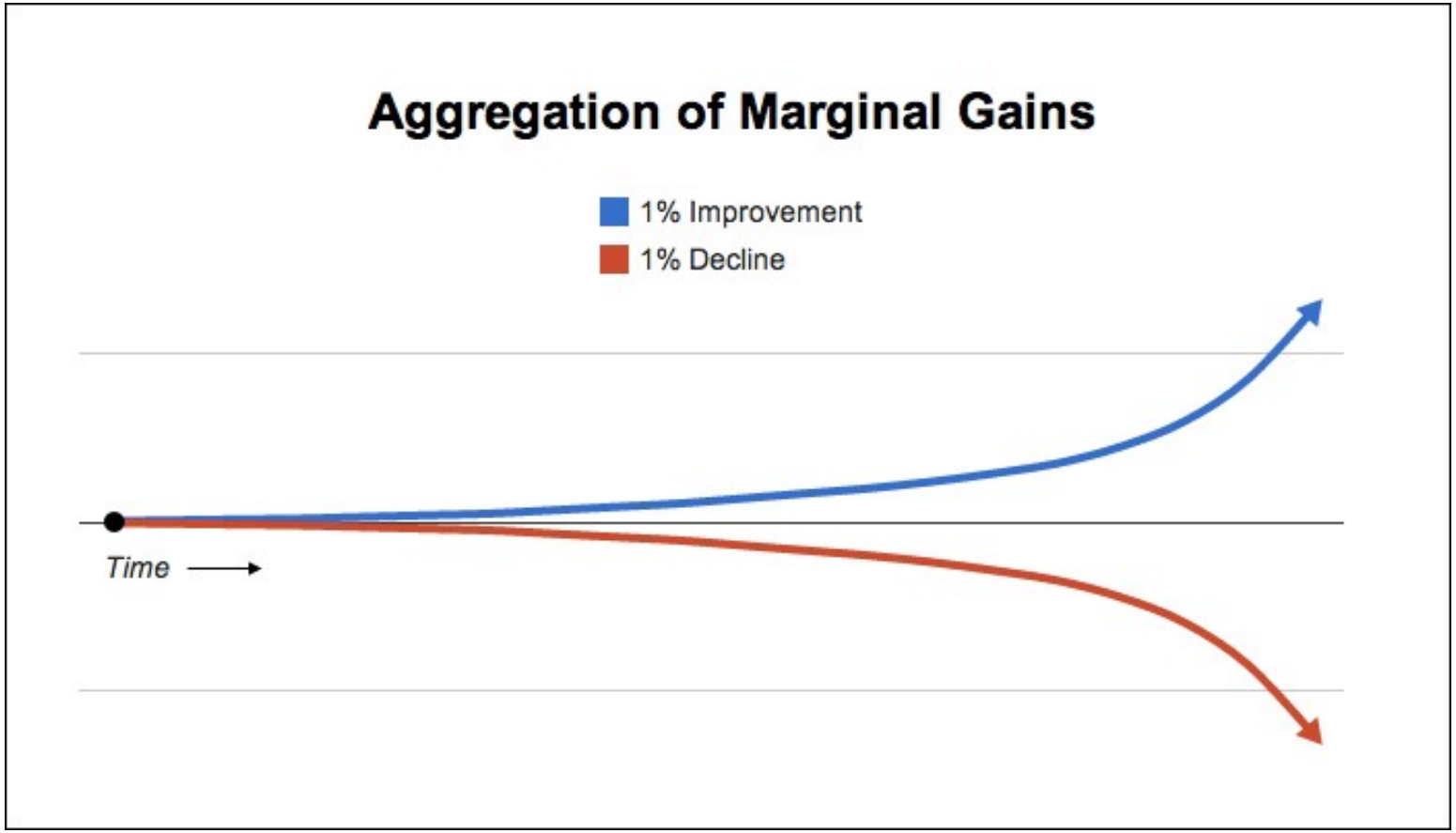
1% Rule



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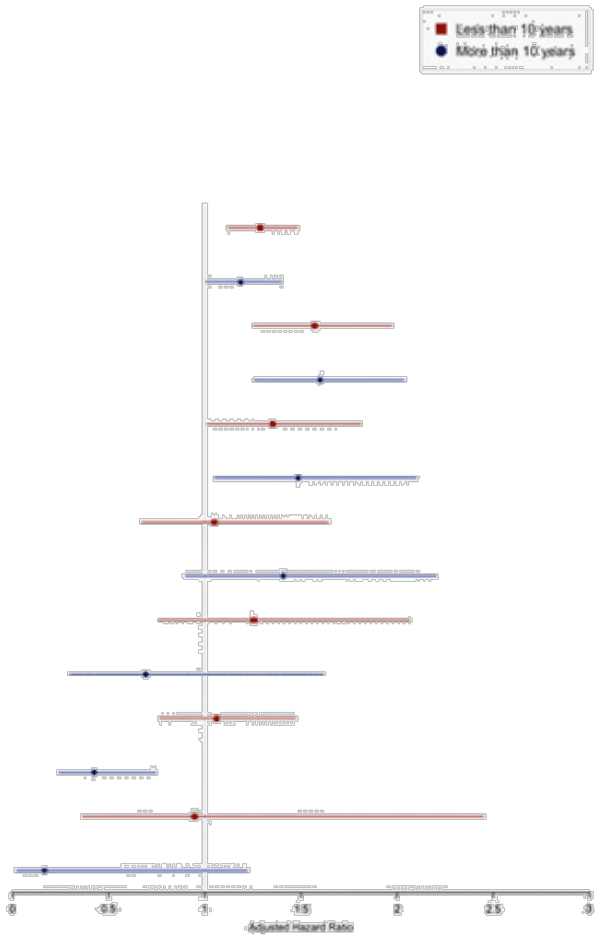
Background

a

Region of Origin (among females)	Adjusted HR (95% CI)	
	Less than 10 years	More than 10 years
Overall	**1.29** (1.12-1.48)	**1.19** (1.01-1.40)
East Asia and Pacific	**1.57** (1.25-1.97)	**1.60** (1.26-2.04)
Europe and Central Asia	**1.35** (1.01-1.81)	**1.49** (1.05-2.10)
Latin America and the Caribbean	1.05 (0.67-1.64)	1.41 (0.90-2.20)
Middle East and North Africa	1.25 (0.76-2.07)	0.69 (0.30-1.62)
South Asia	1.06 (0.77-1.47)	**0.42** (0.24-0.74)
Sub-Saharan Africa	0.95 (0.36-2.45)	0.17 (0.02-1.22)



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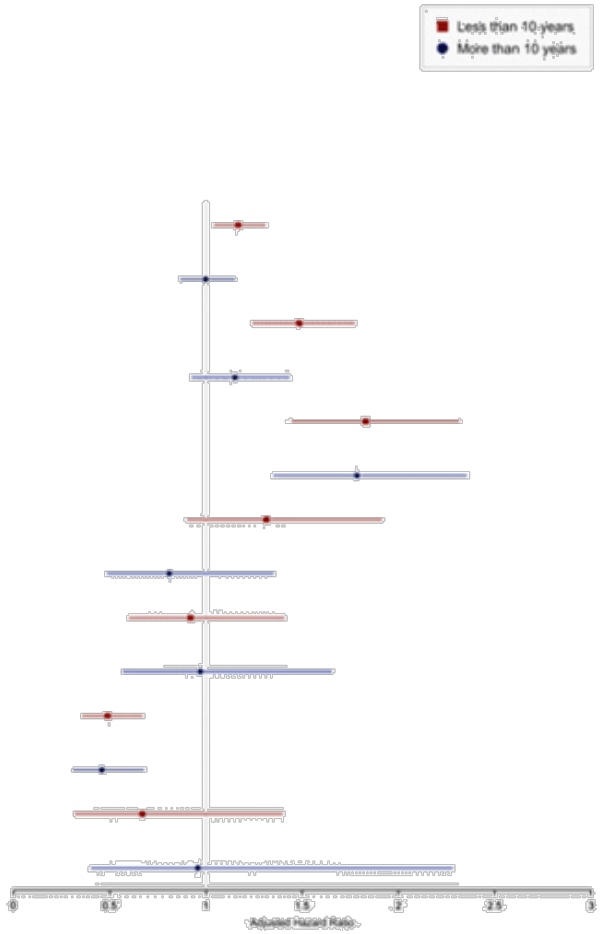
Background

b

Region of Origin (among males)	Adjusted HR (95% CI)	
	Less than 10 years	More than 10 years
Overall	**1.17** (1.04-1.31)	1.00 (0.87-1.15)
East Asia and Pacific	**1.48** (1.24-1.77)	1.15 (0.93-1.43)
Europe and Central Asia	**1.83** (1.45-2.31)	**1.78** (1.35-2.35)
Latin America and the Caribbean	1.31 (0.90-1.91)	0.81 (0.49-1.35)
Middle East and North Africa	0.92 (0.60-1.41)	0.97 (0.57-1.65)
South Asia	**0.49** (0.36-0.67)	**0.46** (0.31-0.68)
Sub-Saharan Africa	0.67 (0.32-1.40)	0.96 (0.40-2.28)



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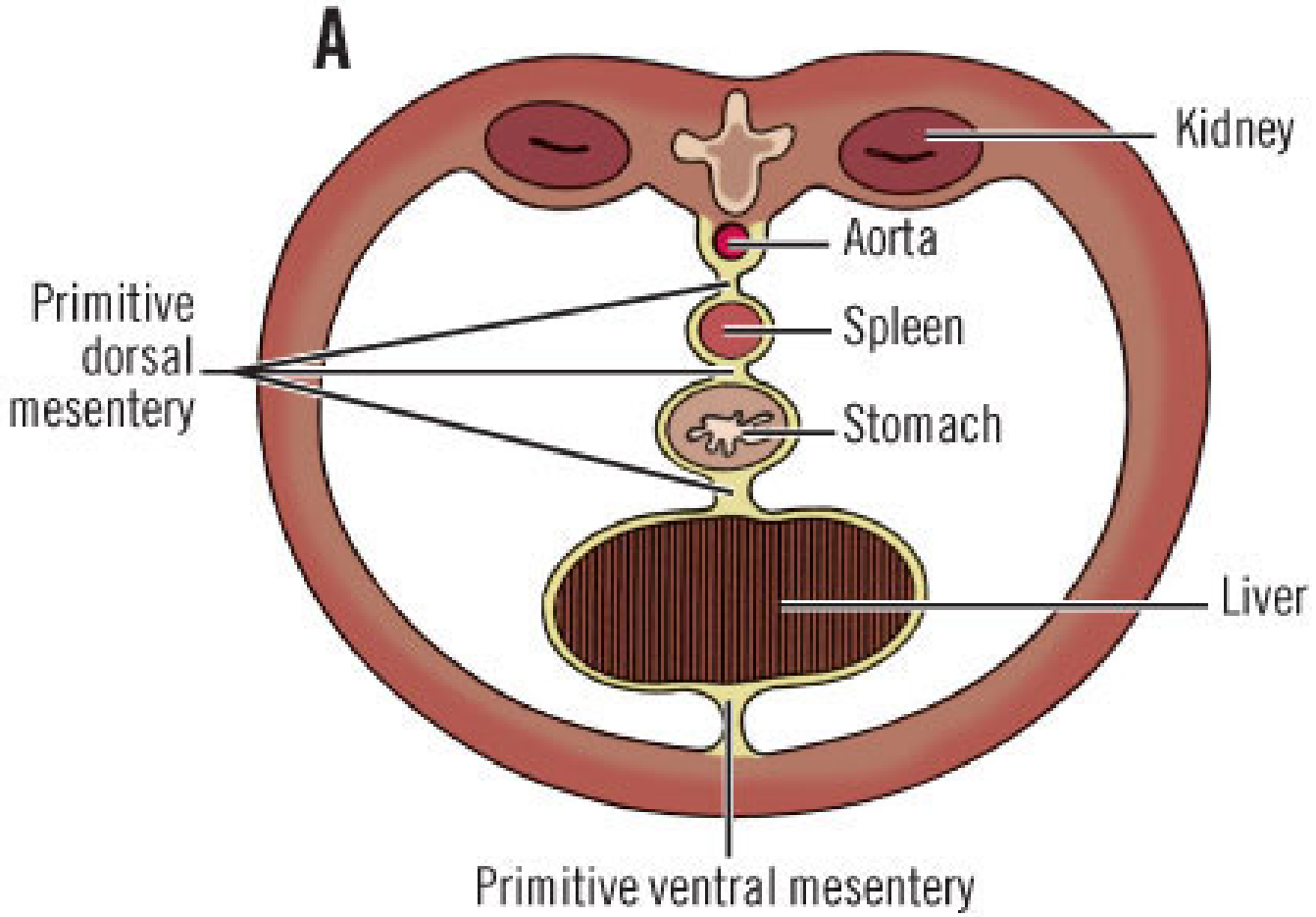
Extended Lymphadenectomy



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H. Pylori

- Approx 20% population is infected with H.Pylori
  - 10 % develop peptic ulcer disease
  - 3% develop gastric adenocarcinoma
  - <0.1% develop MALT lymphoma

- risk of gastric carcinoma is influenced not only by H. pylori strain and host genetics but also by environment

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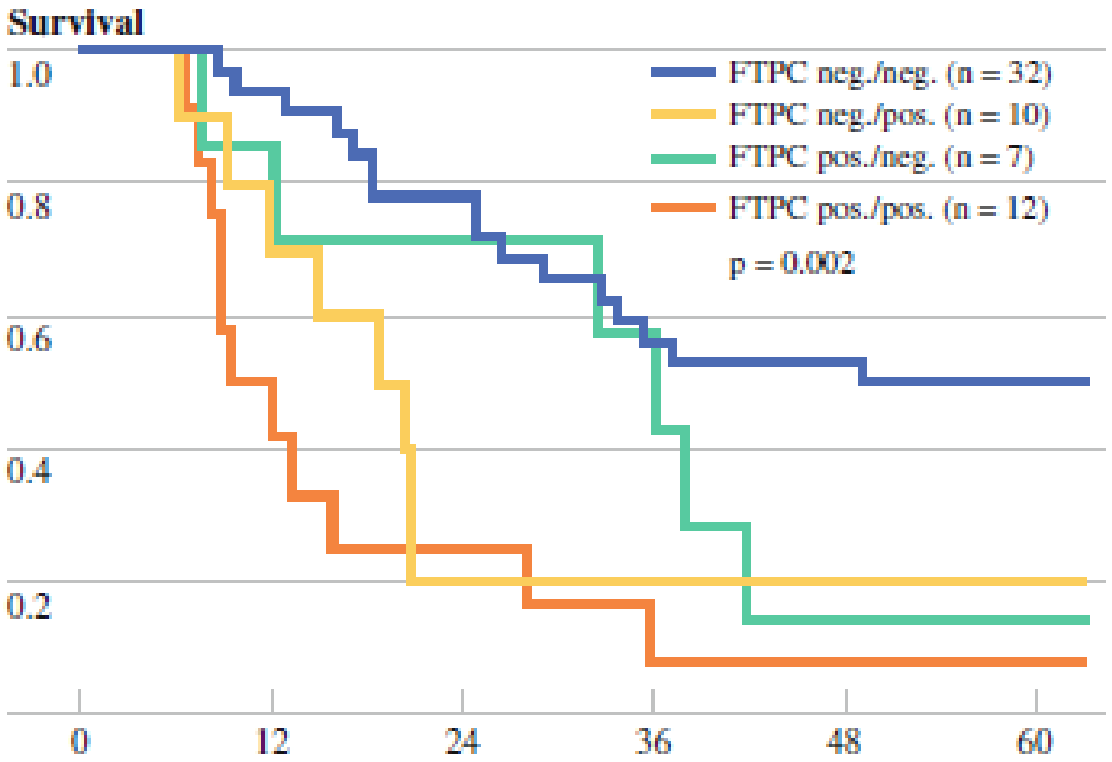
M1 Cyt+



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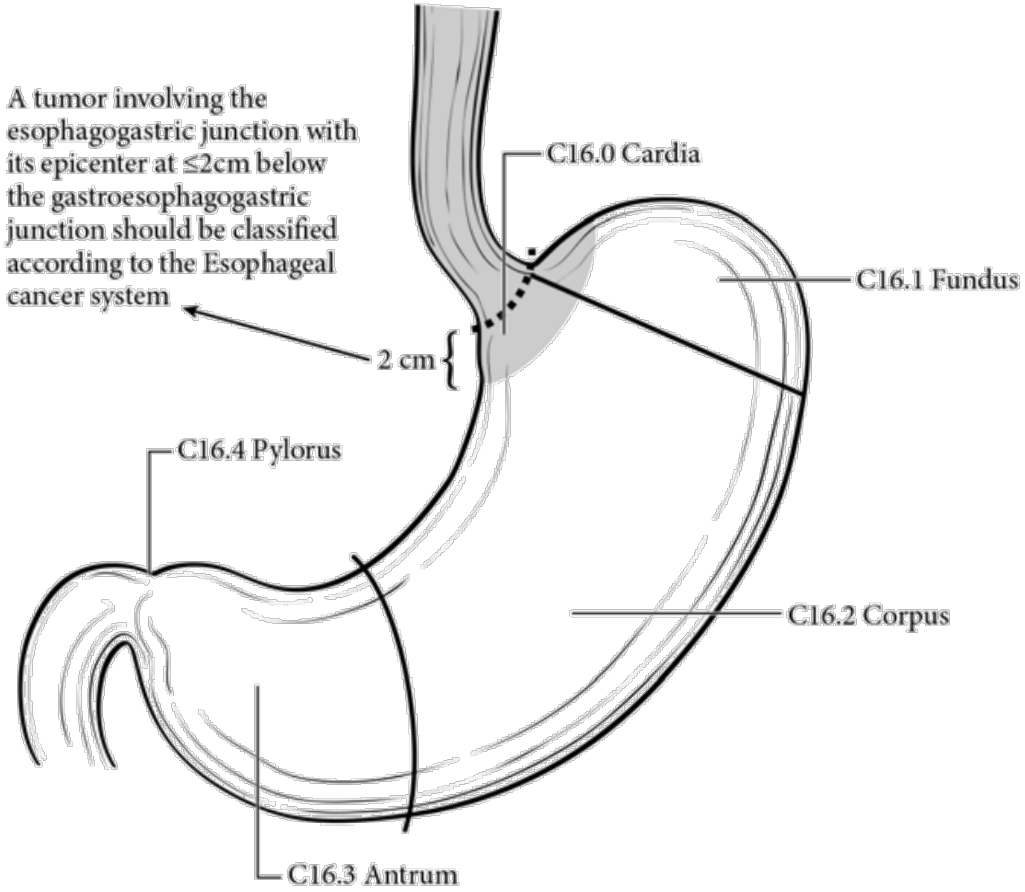
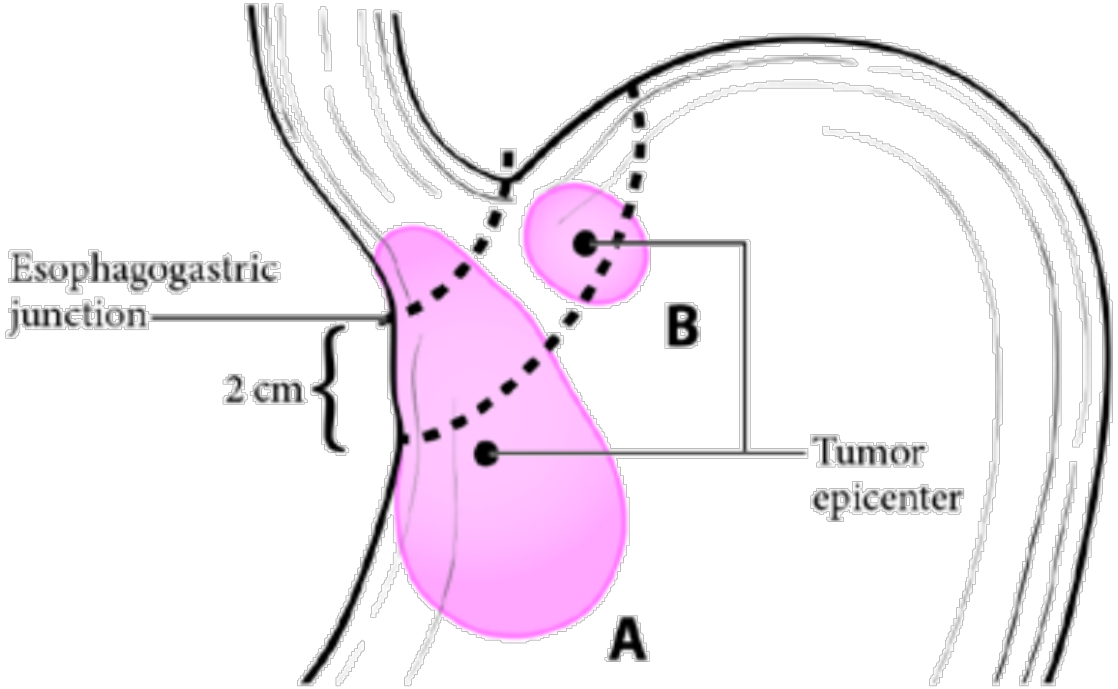
AJCC8





A tumor that has its epicenter located >2 cm from esophagogastric junction (A) or a tumor located within 2 cm of the esophagogastric junction (B) but does not involve the esophagogastric junction is classified as stomach cancer.

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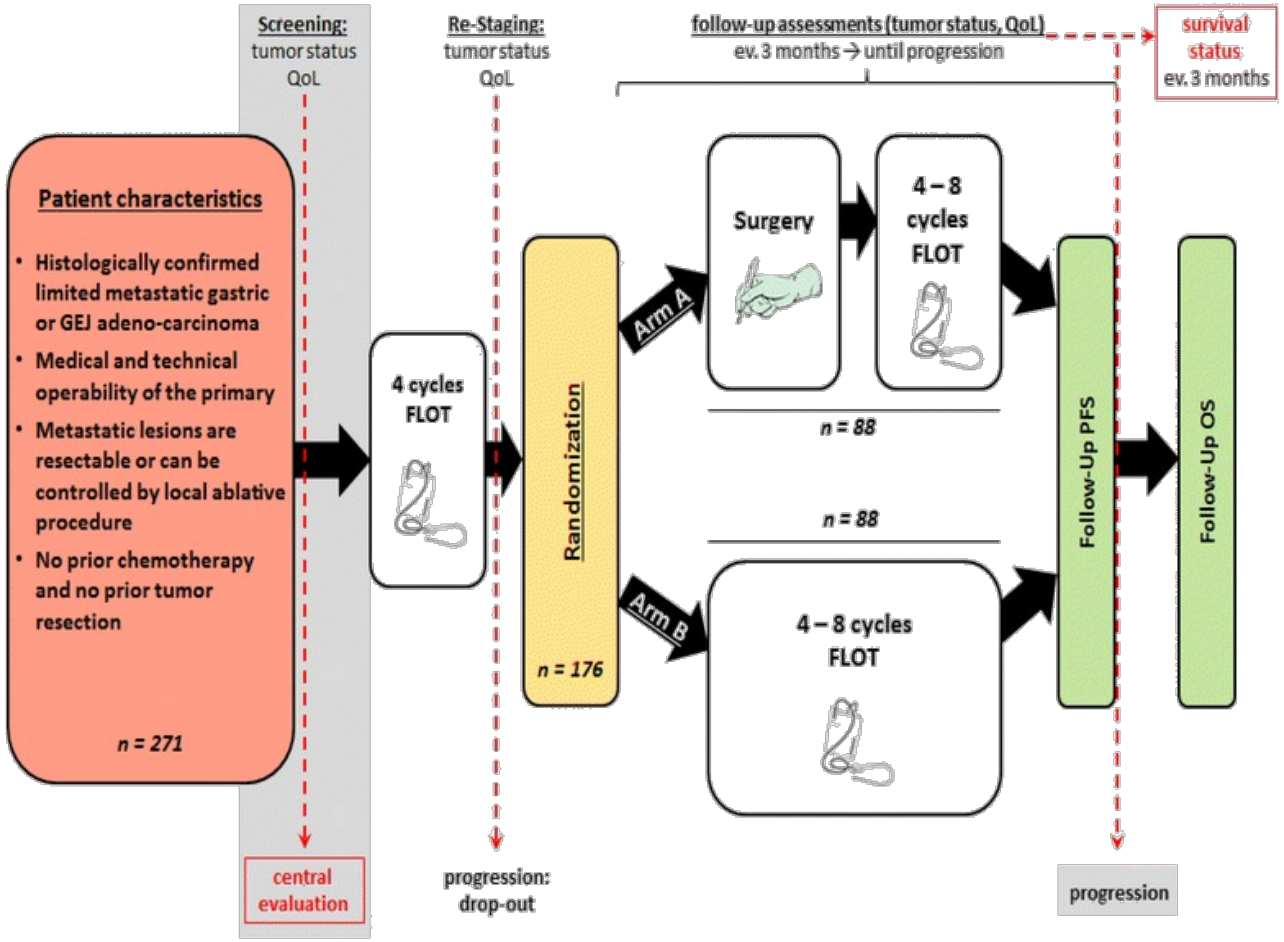
RENAISSANCE Trial



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AJCC8

Staging depends on when it is being done:

- Clinical staging (cTNM)
- Pathologic staging (pTNM)
- Postneoadjuvant staging (ypTNM)

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AJCC8 - cTNM

T	N	M	Stage
T1	N0	M0	I
T2	N0	M0	I
T1	N+	M0	IIA
T2	N+	M0	IIA
T3	N0	M0	IIB
T4a	N0	M0	IIB
T3	N+	M0	III
T4a	N+	M0	III
T4b	Any N	M0	IVA
Any T	Any N	M+	IVB

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EUS

EUS is recommended in guidelines but:

- Difficult to arrange
- Operator dependent
- Moderate inter-observer agreement
- Diagnostic accuracy for T stage is 75%
- Diagnostic accuracy for N stage is 64%

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Staging laparoscopy

- to evaluate metastatic disease undetected by imaging → *Up to 30% of patients*
  - Peritoneal carcinomatosis
  - Peritoneal cytology
  - Liver metastasis
  - Non-regional lymph nodes
- **IDEALLY** – should be completed prior to chemotherapy +/- before surgery

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Cytology +

- Peritoneal Cytology positive patients are metastatic according to TNM staging but use of cytology is controversial
- No standardization in technique
  - Which patients to tests
  - How much fluid
  - How cytology is done

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